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THE DATA BASE FOR THE MAY 1979 MARINE SURFACE LAYER MICROMETEOR—ETC(U)

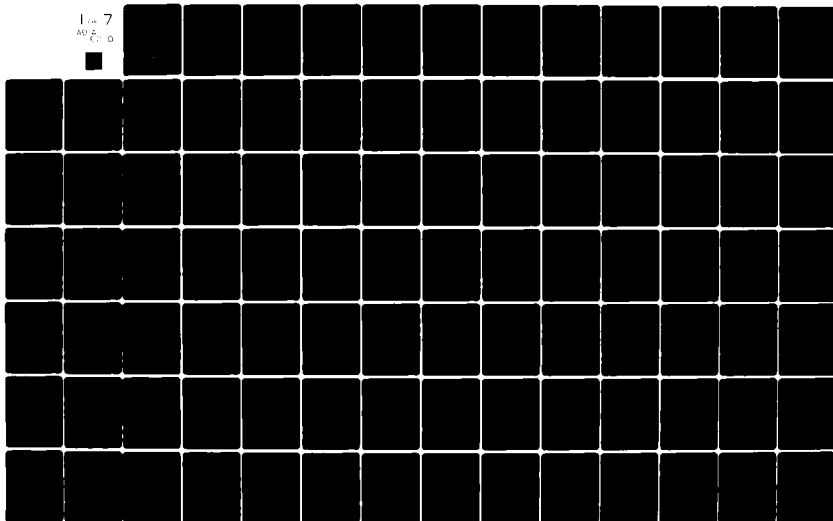
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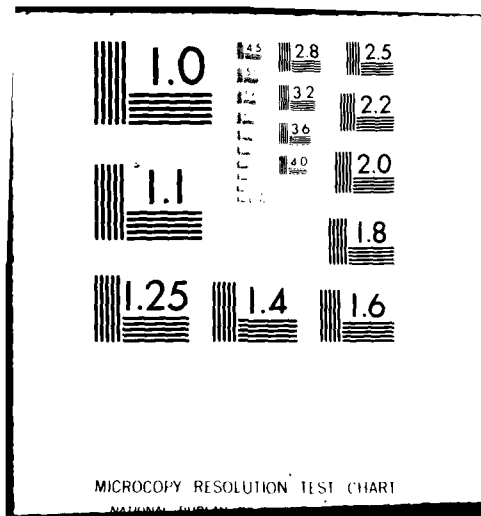
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NRL Memorandum Report 4713

**The Data Base for the May 1979  
Marine Surface Layer Micrometeorological Experiment  
at San Nicolas Island, California**

THEODORE V. BLANC

*Atmospheric Physics Branch  
Environmental Sciences Division*

May 7, 1982



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) One hundred thirty-six hours of gradient (profile) and bulk aerodynamic measurements of momentum, moisture, and sensible heat flux, accompanied by determinations of stability, drag coefficient, roughness length, and sky radiation were made in the marine atmospheric surface layer over the Pacific Ocean from an upwind, low-profile promontory of San Nicolas Island, California. Over a 10-day period a wide variety of meteorological and oceanographic conditions were observed in which 30-minute average wind speeds ranged from 2 to 17 m/s, air-water temperature differences from -2.1 to +0.6°C, dew point-water temperature differences from -7.5 to -2.0°C. (Continued)		

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20. ABSTRACT (Continued)

and Richardson number stabilities from -2.7 to +0.1. Subsequently, 10% of the data were acquired under stable atmospheric conditions and 15% at wind speeds in excess of 12 m/s. The micro-meteorological observations were accompanied by 80 hours of aerosol size distribution observations of particles ranging from 0.3 to 14  $\mu\text{m}$  in radius, 171 hourly measurements of upwind wave period and height, 59 hourly measurements of atmospheric radon ( $^{222}\text{Rn}$ ), and typically twice daily high resolution radiosonde measurements for determining the height of the marine inversion. The data includes measurement error values for the various flux and stability related parameters. Because the data base forms a unique collection of maritime observations, considerable care has been taken to present the data in an easily usable form. The data base is also available on magnetic floppy disk and, along with the various details of the experiment, in graphic form in NRL Report 8363.

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# **The Data Base for the May 1979 Marine Surface Layer Micrometeorological Experiment at San Nicolas Island, California**

THEODORE V. BLANC

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Environmental Sciences Division*

**Abstract** — One hundred thirty-six hours of gradient (profile) and bulk aerodynamic measurements of momentum, moisture, and sensible heat flux, accompanied by determinations of stability, drag coefficient, roughness length, and sky radiation were made in the marine atmospheric surface layer over the Pacific Ocean from an upwind, low-profile promontory of San Nicolas Island, California. Over a 10-day period a wide variety of meteorological and oceanographic conditions were observed in which 30-minute average wind speeds ranged from 2 to 17 m/s, air-water temperature differences from  $-2.1$  to  $+0.6^{\circ}\text{C}$ , dew point-water temperature differences from  $-7.5$  to  $-2.0^{\circ}\text{C}$ , and Richardson number stabilities from  $-2.7$  to  $+0.1$ . Subsequently, 10% of the data were acquired under stable atmospheric conditions and 15% at wind speeds in excess of 12 m/s. The micrometeorological observations were accompanied by 80 hours of aerosol size distribution observations of particles ranging from 0.3 to  $14\text{ }\mu\text{m}$  in radius, 171 hourly measurements of upwind wave period and height, 59 hourly measurements of atmospheric radon ( $^{222}\text{Rn}$ ), and typically twice daily high resolution radiosonde measurements for determining the height of the marine inversion. The data includes measurement error values for the various flux and stability related parameters. Because the data base forms a unique collection of maritime observations, considerable care has been taken to present the data in an easily usable form. The data base is also available on magnetic floppy disk and, along with the various details of the experiment, in graphic form in NRL report 8363.

## **1. Introduction**

A previous NRL formal report 8363, Blanc (1981), presented a detailed description and analysis of the marine surface layer experiment conducted at San Nicolas Island, California, in May of 1979. In that earlier report, all of the data and much of the analysis was presented in a graphic format. This report presents the measurements in a tabular form upon which the previous report was based. Because the data base represents a unique collection of observations made under an unusually wide variety of meteorological and oceanographic conditions, considerable care has been taken to present the data in a fashion which is self-explanatory and which is conducive to its easy utilization. Interpretations of the data which may differ from those presented in Blanc (1981), or which may have different objectives in mind, are invited. Some observations of precipitation, visibility, and cloud cover made in the vicinity of the micrometeorological observation site are available in Williams et al. (1979). The micrometeorological data presented in this report is also available on Hewlett-Packard model 9885 or Tektronix model 4907 compatible floppy disk upon request to the author. All of the data are presented in chronological order cataloged in local Pacific Standard Time (PST).

## 2. Distribution of Observations by Day, Hour, and Run Number

Table 2.1 — Distribution of the Observations for the May 1979 Marine Surface Layer Experiment at San Nicolas Island, California

Approx. Start Time (PST)	1979									
	1 May	2 May	3 May	4 May	5 May	6 May	7 May	8 May	9 May	10 May
00:00		†	030000*†	040000*†	050000 †			080000*†	090000 †	100000 †
00:30			030030*	040030*	050030			080030*	090030	100030
01:00		†	030100*†	040100*†	050100 †			080100*†	090100 †	100100 †
01:30			030130*	040130*	050130			080130*	090130	100130
02:00		†	030200*†	040200*†	050200 †			080200*†	090200 †	100200 †
02:30			030230*	040230*	050230			080230*	090230	100230
03:00		†	030300*†	040300*†	050300 †			080300*†	090300 †	100300 †
03:30			030330*	040330*	050330			080330*	090330	100330
04:00		†	030400*†	040400*†	050400 †			080400*†	090400 †	100400 †
04:30			030430*	040430*	050430			080430*	090430	
05:00		†	030500*†	040500*†	050500 †			080500*†	090500 †	†
05:30			030530*	040530*	050530			080530*	090530	
06:00		†	030600*†	040600*†	050600 †		†	080600*†	090600 †	†
06:30			030630*	040630*	050630			080630*	090630	
07:00	□	†	030700*†	*†	050700 † □		†	080700*†Δ□	†□	†
07:30		□	030730*	*	050730			080730*	Δ	*Δ
08:00		†Δ	030800*†Δ□	*†Δ□	050800 †		†□	080800*†Δ	090800 †Δ	*†
08:30			030830*	040830*	050830			080830*	090830	100830 Δ
09:00		†Δ	030900 †Δ	040900*†Δ	050900 †		†	080900*†Δ	090900 †Δ	†Δ
09:30			030930*	040930*	050930			080930*	090930	□
10:00		†Δ	031000*†Δ	041000*†Δ	051000 †		†Δ	*†Δ	091000 †Δ	Δ
10:30			031030*	041030*	051030			*	091030	
11:00		†Δ	031100*†Δ	041100*†Δ	051100 † □		†Δ	*†Δ	091100 †	
11:30		*	031130*	*	051130			*	091130	□
12:00	†Δ	*†Δ	031200*†Δ	†Δ	051200 †		†Δ	*†Δ	091200 Δ	
12:30		*	031230*	041230	051230			081230*	091230	
13:00	†Δ	*†Δ	031300*†Δ	041300 †	051300 †		071300*†	081300*†Δ	091300 Δ	
13:30		021330*	031330*	041330	051330		071330* □	081330*	091330	□
14:00	†Δ□	021400*†Δ	031400*†Δ	041400 †	051400 †		071400*†Δ	081400*†Δ	091400 Δ	
14:30		021430*	031430* □	041430 □	051430		071430*	081430*	091430	
15:00	†Δ	021500*†Δ	031500*†	041500 †	051500 † □		071500*†	081500*†	091500 † □	
15:30	011530	021530* □	031530*	041530	051530		*	081530*	091530	
16:00	011600 †	021600*†	031600*†	041600 †	051600 †		*†	081600*†	091600	
16:30	011630	021630*	031630*	041630	051630		*	081630*	091630	
17:00	011700 †Δ	021700*†Δ	031700*†	041700 †	051700 †		071700*†	081700*†	091700	
17:30		021730*	031730*	041730	051730		071730*	081730*	091730	
18:00	†Δ	021800*†Δ	031800*†	041800 †	†		071800*†	081800*†Δ	091800 Δ	
18:30		021830*	031830* Δ	041830			071830*	081830*	091830	
19:00	†Δ	021900*†Δ	031900*†	041900 †	□		071900*†	081900*†Δ	091900 †Δ	
19:30	011930	021930*	*	041930			071930*	081930	091930	
20:00	012000 †	*†	032000*†	042000 †			072000*†	082000 †Δ	092000 †	
20:30	012030	022030*	032030*	042030			072030*	082030	092030	
21:00	012100 †	022100*†	032100*†	042100 †			072100*†	082100 †	092100 †	
21:30		022130*	032130*	042130			072130*	082130	092130	
22:00	†	022200*†	032200*†	042200 †			072200*†	082200 †	092200 †	
22:30		022230*	032230*	042230			072230*	082230	092230	
23:00	†	022300*†	032300*†	042300†			072300*†	082300 †	092300 †	
23:30		022330*	032330*	042330			072330*	082330	092330	

Six digit number indicates micrometeorological observation. 7905 + (six digit number in table) = run number. The run number is data run start time (year, month, day, hour, minute) in local Pacific Standard time rounded off to the nearest clock half hour. See pp. 3-547.

\*indicates aerosol size distribution observation. See pp. 549-553.

†indicates wave period and wave height observation. See. p. 555-557

Δindicates atmospheric radon observation. See. p. 558.

□indicates inversion-base height observation. See. p. 559.

### 3. Micrometeorological Observations

The 272 half hour micrometeorological observations, presented in graphic form and analyzed in Blanc (1981), are presented in tabular form. The Businger et al. (1971) scheme, described in Businger (1973), was used to compute the profile-derived flux and stability parameters with the von Kármán constant set equal to 0.40. This procedure renders the Businger et al. profile scheme equivalent to that proposed by Dyer and Hicks (1970). The Friehe and Schmitt (1976) scheme, described in Friehe and Pazan (1978), was used to compute the bulk-derived flux and stability parameters with the Smith and Banke (1975) formulation for drag coefficient. Approximately 190 parameters are presented in this section of the report which were computed and stored on magnetic disk for each 30-min long data run. They include the results of such calculations as the upwind fetch length over the island promontory, the wind speed profile escarpment corrections, the error values for the various flux related parameters, and the newly proposed composite profile-bulk flux method determinations. The roughness length and drag coefficient values are listed beneath the various scaling parameter columns. The data contained on magnetic floppy disk are cataloged by a 10-digit run number which represents the data start time (year, month, day, hour, minute) in local Pacific Standard Time rounded off to the nearest clock half hour.

It is of interest to note that for the minor event of profile observed downward humidity flux reported in this section and in Blanc (1981) for 4 May, 1979, Matthews and Akkerman (1979) reported the observation of fog between 8:30 and 9:30 PST.

In retrospect, the selection of the term "total heat budget flux" in this section and in Blanc (1981) to represent the sum of latent heat, sensible heat, and shortwave sky radiation was unfortunate. Following the example of Friehe and Pazan (1978), we should have employed a term such as "net heat flux," or "perhaps composite heat flux," since we did not have available a measurements of incoming and outgoing longwave radiation.

For a listing of the variable labels under which the data is stored on magnetic disk, see pp. 562-581. For a listing of the various parameters minimum, maximum, mean, and standard deviation values, see pp. 560-561. For a complete listing of the equations employed for the micrometeorological calculations, see pp. 564-598. The various micrometeorological computer programs are listed on pp. 600-627.

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905011530  
START TIME: 15:31:20 PST  
END TIME: 16: 1:20 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUC. 1 0.000	No. 02 TEMP. STRUC. 2 0.001	No. 03 DEW POINT 1 5.035	No. 04 DEW POINT 2 4.945	No. 05 WIND SPEED 1 6.164	No. 06 WIND SPEED 2 5.850	No. 07 BAR. PRES. 2 4.686	No. 08 SKY RAD. 3.900	No. 09 WIND DIR. 4.751
No. 10 BULK WT TEMP 4.512	No. 11 AC FREQUENCY 3.962	No. 12 AC VOLTAGE 2.514	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 134535	No. 2 AIR TEMP. 2 1421 135387	UPWIND NEAR HEIGHT/LENGTH 0.157	UPWIND LAND PATH (Meters) 104	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.993	WS2EC (Coeff.) 0.959
-------------------------------------	-------------------------------------	---------------------------------------	-------------------------------------	------------------------------	-----------------------------	-----------------------------	----------------------------	----------------------------

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV (No. >.005V) 0	VOLT. REF. DEV (No. >.005V) 0	ZERO REF. DEV (No. >.002V) 0	AC VOLT. FLUX (No. >5V) 0	AC FREQ. FLUX (No. >1Hz) 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 59.96
---------------------------------	---------------------------------	---------------------------------	-------------------------------------	-------------------------------------	------------------------------------	---------------------------------	----------------------------------	------------------------------	-------------------------------

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 13.454	WIND SPEED 1 (Meter/sec) 11.87	DEW POINT 1 (Celsius) 9.75	TEMP. STRUC. 1 (Kel. xM-2/3) NO DATA	WIND DIR. (Deg. True) 306.5	BAR. PRES. 1 (Millibar) 1010.10	SKY RAD. (Watt/m2) -5.44E 02	BULK WT TEMP (Celsius) 14.141	MEAN AIR TEMP (Kelvin) 286.656
AIR TEMP. 2 (Celsius) 13.539	WIND SPEED 2 (Meter/sec) 10.98	DEW POINT 2 (Celsius) 9.15	TEMP. STRUC. 2 (Kel. xM-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.11	BAR. PRES. 2 (Millibar) 1011.20			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 13.633	VIR. TEMP. 1 (Celsius) 14.750	V. POT. TEMP. 1 (Celsius) 14.930	ABS. HUMID. 1 (Kg/m3) 9.095E-03	REL. HUMID. 1 (Percent) 78.27	SPEC. HUMID. 1 (Kg/Kg) 7.441E-03	VAP. PRES. 1 (Millibar) 12.031	S. VAP. PRES. 1 (Millibar) 15.371	REF. INDEX 1 (Kel. xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 13.629	VIR. TEMP. 2 (Celsius) 14.784	V. POT. TEMP. 2 (Celsius) 14.874	ABS. HUMID. 2 (Kg/m3) 8.740E-03	REL. HUMID. 2 (Percent) 74.74	SPEC. HUMID. 2 (Kg/Kg) 7.144E-03	VAP. PRES. 2 (Millibar) 11.564	S. VAP. PRES. 2 (Millibar) 15.473	REF. INDEX 2 (Kel. xM-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905011530  
START TIME: 15:31:20 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.003 AT GMH	MOMENTUM FLUX (Nt/m2) -3.37E-01	FRICTION VELOCITY (Meters/sec) 5.246E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(\ln(Z1/Z2))] * (Z1/Z2)^{1/2}$	GENERAL FORM: $N' SLOPE = [(N1-Z1-PSI) - (N2-Z2-PSI)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -1.51E-04	SCALING SPEC. HUMID. (Kg/Kg) 2.352E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 9.94E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.62E-01
Z/L AT GMH -0.004	LAT. HEAT FLUX (Watts/m2) -3.73E 02	SCALING POT. TEMP. (Kelvin) -6.321E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 3.32E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 2.30E 03
Z/L AT 10 METERS -0.003	BEN. HEAT FLUX (Watts/m2) 4.10E 00	ROUGHNESS LENGTH (Meters) 5.652E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.55E 01
Z/L AT Z1 -0.006	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.44E 02	DRAG COEF. AT 10 METERS (Dimensionless) 2.27E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.003	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.12E 02			
MONIN-OBUKHOV LENGTH (Meters) -3.171E 03	ROMEN RATIO (no units) -0.011			
PSI1 AT Z1= 0.021139 PSI1 AT Z2= 0.010736 PSI2 AT Z1= 0.012775 PSI2 AT Z2= 0.006466				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK BEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
---	--	---	---	---	---

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

PTK1-PTK2= +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2230  
  
AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4158E 02  
  
WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8468E 05



RUN NUMBER: 7905011530  
 START TIME: 15:31:20 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.528	11.08	9.22	NO DATA	1011.10	14.141	-0.613	-0.515	0.639	0.737

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin)
10.00	13.626	14.780	14.878	8.783E-03	75.16	7.179E-03	11.620	15.461	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.015 AT GMH	MOMENTUM FLUX (Nt/m2) -2.05E-01	FRICTION VELOCITY (Meters/sec) 4.090E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.672E-01	AIR DENSITY (Kg/m3) 1.2233
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.93E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.845E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.925E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
Z/L AT GMH -0.019	LAT.HEAT FLUX (Watts/m2) 1.22E 02	SCALING POT.TEMP. (Kelvin) -1.773E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.249E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8966E 05
Z/L AT 10 METERS -0.014	SEN.HEAT FLUX (Watts/m2) 8.97E 00	ROUGHNESS LENGTH (Meters) 2.418E-04		VAP.PRES.AT WT LEVEL (Millibar) 16.109
MONIN-OBUKHOV LENGTH (Meters) -6.903E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.44E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.361E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.215E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.13E 02			BAR.PRES.AT WT LEVEL (Millibar) 1012.30
	BOWEN RATIO (no units) 0.074			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
172%	172%	89%	80%	153%	5%	33%	234%	45%	36%	109%	65%	89%
227%	227%	46%	40%	155%	5%	9%	195%	23%	63%	178%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905011530  
 START TIME: 15:31:20 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.008 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.49E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.483E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.72E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) 1.145E-04 [3.0E-05]
Z/L AT GMH -0.010 [0.02]	LAT.HEAT FLUX (Watts/m2) -4.24E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.065E-02 [2.0E-02]
Z/L AT 10 METERS -0.008 [0.02]	SEN.HEAT FLUX (Watts/m2) 6.52E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.710E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.245E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.44E 02 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.646E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.17E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.035 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
29%	29%	28%	614%	37%	0%	56%	53%	14%	151%	29%	44%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905011600  
START TIME: 16:11:30 PST  
END TIME: 16:31:40 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VO.T.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.106	4.974	6.273	5.921	4.678	3.139	4.799
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.430	3.917	2.512	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 134335	1421 134974	0.157	106	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOL. FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.92

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.434	12.08	10.17	NO DATA	308.2	1009.97	-4.38E 02	14.061	286.625

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
13.497	11.11	9.32	NO DATA	0.08	1011.07

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.613	14.768	14.947	9.356E-03	80.62	7.656E-03	12.375	15.349	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.588	14.757	14.848	8.845E-03	75.83	7.230E-03	11.701	15.430	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905011600  
START TIME: 16:11:30 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.008 AT GMM	MOMENTUM FLUX (Nt/m2) -3.46E-01	FRICTION VELOCITY (Meters/sec) 5.316E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM=(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -2.02E-04	SCALING SPEC. HUMID. (Kg/Kg) 3.104E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.08E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.52E-01
Z/L AT GMM 0.012	LAT. HEAT FLUX (Watts/m2) -4.98E 02	SCALING POT. TEMP. (Kelvin) 1.879E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 4.76E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 1.74E 03
Z/L AT 10 METERS 0.009	SEN. HEAT FLUX (Watts/m2) -1.24E 01	ROUGHNESS LENGTH (Meters) 5.908E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 2.88E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 2.88E 01
Z/L AT Z1 0.017	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.38E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.254E-03		N=LnTEMP.STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.48E 02			
MONIN-OBUKHOV LENGTH (Meters) 1.107E 03	BOWEN RATIO (no units) 0.025			
PSI1 AT Z1= -0.077926 PSI1 AT Z2= -0.039049 PSI2 AT Z1= -0.105306 PSI2 AT Z2= -0.052796				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2228

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4161E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8970E 03

RUN NUMBER: 7905011600  
 START TIME: 16: 1:30 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3) NO DATA	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.498	11.22	9.43		1010.98	14.061	-0.572	-0.474	0.697	0.795

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kc)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3) NO DATA
10.00	13.588	14.758	14.856	8.906E-03	76.48	7.280E-03	11.781	15.420	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIFIE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP,=-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable,=-Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -2.11E-01	FRICTION VELOCITY (Meters/sec) 4.155E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.727E-01	AIR DENSITY (Kg/m3) 1.2233
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.72E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.277E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.715E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMH -0.017	LAT.HEAT FLUX (Watts/m2) 1.16E 02	SCALING POT.TEMP. (Kelvin) -1.659E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 6.093E-03	WATER LA..HEAT VAP. (ITcal./Kg) 5.8968E 05
Z/L AT 10 METERS -0.013	SEN.HEAT FLUX (Watts/m2) 8.53E 00	ROUGHNESS LENGTH (Meters) 2.556E-04		VAP.PRES.AT WT LEVEL (Millibar) 16.024
MONIN-OBUKHOV LENGTH (Meters) -7.616E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.38E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.371E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.209E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.13E 02			BAR.PRES.AT WT LEVEL (Millibar) 1012.10
	BOWEN RATIO (no units) 0.073			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
98%	106%	78%	63%	76%	5%	33%	139%	39%	24%	37%	59%	78%
236%	236%	46%	41%	164%	5%	10%	204%	23%	64%	187%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905011600  
 START TIME: 16: 1:30 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP,=-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable,=-Unstable) 0.002 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.61E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.585E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -4.99E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) 1.987E-04 [3.8E-05]
Z/L AT GMH 0.003 [0.02]	LAT.HEAT FLUX (Watts/m2) -1.23E 02 [2.0E+01]	SCALING POT.TEMP. (Kelvin) 1.298E-02 [2.0E-02]
Z/L AT 10 METERS 0.002 [0.02]	SEN.HEAT FLUX (Watts/m2) -5.75E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.968E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 4.655E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.38E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.670E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.55E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.044 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
58%	59%	27%	255%	194%	0%	80%	31%	13%	111%	107%	43%	28%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905011630  
START TIME: 16:31:50 PST  
END TIME: 17: 2: 0 PST  
START DATE: 1 May 1979 (DAY 1-1)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.203	5.012	6.190	5.832	4.668	2.372	4.839
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.344	3.869	2.516	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 133883	1421 134343	0.157	108	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.388	11.92	10.75	NO DATA	309.5	1009.82	-3.31E 02	13.977	286.571
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Meter MSL)	(Millibar)			
13.434	10.94	9.55	NO DATA	0.05	1010.92			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
18.35	13.568	14.775	14.955	9.724E-03	84.04	7.958E-03	12.859	15.301	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
9.20	13.524	14.714	14.804	8.982E-03	77.32	7.342E-03	11.880	15.364	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905011630  
START TIME: 16:31:50 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014 AT GMH	MOMENTUM FLUX (Nt/m2) -3.26E-01	FRICITION VELOCITY (Meters/sec) 5.160E-01	GENERAL FORM: $DN/DZ = (N1-N2)/[Ln(Z1/Z2)]$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -2.70E-04	SCALING SPEC. HUMID. (Kg/Kg) 4.273E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DSW/DZ = 1.09E-01$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis $PSI=PSI1$ WS SLOPE= 7.75E-01
Z/L AT GMH 0.020	LAT. HEAT FLUX (Watts/m2) -6.66E 02	SCALING POT. TEMP. (Kelvin) 3.025E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DSH/DZ = 6.87E-05$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis $PSI=PSI2$ SH SLOPE= 1.26E 03
Z/L AT 10 METERS 0.015	SEN. HEAT FLUX (Watts/m2) -1.93E 01	ROUGHNESS LENGTH (Meters) 5.350E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = 4.87E-03$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis $PSI=PSI1$ PTK SLOPE= 1.79E 01
Z/L AT Z1 0.028	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.31E 02	DRAG COEF. AT 10 METERS (Dimensionless) 2.186E 03		N=LnTEMP.STRUC.(Km-2/3) Z=HEIGHT (M) Vert. Axis $PSI=NONE$ CT2 SLOPE=NO DATA
Z/L AT Z2 0.014	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.02E 03			
MONIN-OBUKHOV LENGTH (Meters) 6.480E 02	BOWEN RATIO (no units) 0.029			
PSI1 AT Z1= -0.133103 PSI1 AT Z2= -0.066733 PSI2 AT Z1= -0.179869 PSI2 AT Z2= -0.890180				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
---	--	---	---	---	---

## \* GENERAL NOTES:

NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2227

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8973E 05

RUN NUMBER: 7905011630  
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MARINE SURFACE LAYER  
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PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xm-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.429	11.06	9.69	NO DATA	1010.83	13.977	-0.549	-0.451	0.743	0.841

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xm-2/3)
10.00	13.527	14.721	14.819	9.069E-03	78.11	7.414E-03	11.995	15.357	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -2.03E-01	FRICTION VELOCITY (Meters/sec) 4.078E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.663E-01	AIR DENSITY (Kg/m3) 1.2233
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.31E-05	SCALING SPEC HUMID. (Kg/Kg) -8.648E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.314E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4160E 02
Z/L AT GMH -0.017	LAT.HEAT FLUX (Watts/m2) 1.07E 02	SCALING POT.TEMP. (Kelvin) -1.615E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 6.585E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8972E 05
Z/L AT 10 METERS -0.013	SEN.HEAT FLUX (Watts/m2) 8.15E 00	ROUGHNESS LENGTH (Meter) 2.395E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.934
MONIN-OBUKHOV LENGTH (Meters) -7.533E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.31E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.360E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.202E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.16E 02			BAR.PRES.AT WT LEVEL (Millibar) 1012.03
	BOWEN RATIO (no units) 0.076			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
84%	96%	76%	56%	62%	5%	37%	118%	38%	18%	24%	58%	76%
241%	241%	46%	42%	169%	5%	11%	210%	23%	65%	192%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905011630  
 START TIME: 16:31:50 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) 0.007 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.49E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.486E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -8.97E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) 3.142E-04 (3.0E-05)
Z/L AT GMH 0.009 (0.02)	LAT.HEAT FLUX (Watts/m2) -2.21E 02 (2.0E+01)	SCALING POT.TEMP. (Kelvin) 2.517E-02 (2.0E-02)
Z/L AT 10 METERS 0.007 (0.02)	SEN.HEAT FLUX (Watts/m2) -1.20E 01 (3.0E+00)	ROUGHNESS LENGTH (Meter) 3.653E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.374E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.31E 02 (2.0E+01)	DRAG COEF.AT 10 METERS (Meters) 1.644E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.01E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.046 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
76%	78%	25%	176%	126%	0%	113%	31%	12%	94%	117%	41%	26%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905011700  
START TIME: 17: 2:10 PST  
END TIME: 17:32:20 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.318	5.032	6.193	5.833	4.669	1.622	4.804
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.239	3.898	2.517	0.001	0.001	0.001	0.001	6.205		

## DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 132337	1421 132867	0.157	110	-0.009	0.000	0.000	0.993	0.959

## SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.90

## OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.234	11.92	11.43	NO DATA	308.3	1009.85	-2.26E 02	13.876	286.420
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
13.287	10.94	9.67	NO DATA	0.01	1010.95			

## CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	UAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.414	14.684	14.864	1.018E-02	88.84	8.331E-03	13.458	15.148	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	UAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.377	14.576	14.666	9.058E-03	78.69	7.400E-03	11.974	15.217	NO DATA

## CONTINUED BELOW

RUN NUMBER: 7905011700  
START TIME: 17: 2:10 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (++UP, --DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (++INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (++Stable, --Unstable) 0.012 AT GMH	MOMENTUM FLUX (Nt/m2) -3.38E-01	FRICTION VELOCITY (Meters/sec) 5.256E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[Ln(Z1/Z2)* (Z1*Z2)^(1/2)]	GENERAL FORM: N'SLOPE= [(LnZ1-PS1)-(LnZ2-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -4.23E-04	SCALING SPEC. HUMID. (Kg/Kg) 6.581E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.09E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 7.61E-01
Z/L AT GMH 0.017	LAT. HEAT FLUX (Watts/m2) -1.84E 03	SCALING POT. TEMP. (Kelvin) 2.598E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.04E-04	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SM SLOPE= 8.21E 02
Z/L AT 10 METERS 0.013	SEN. HEAT FLUX (Watts/m2) -1.68E 01	ROUGHNESS LENGTH (Meters) 5.688E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 4.08E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= 2.89E 01
Z/L AT Z1 0.023	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.26E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.265E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.29E 03			
MONIN-OBUKHOV LENGTH (Meters) 7.046E 02	BOWEN RATIO (no units) 0.016			
PS11 AT Z1= -0.189924 PS11 AT Z2= -0.035112 PS12 AT Z1= -0.148546 PS12 AT Z2= -0.074476				

## GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-83	1.32E-83

## GENERAL NOTES:

NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2232

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4170E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8981E 03

RUN NUMBER: 7905011700  
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MARINE SURFACE LAYER  
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PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.280	11.06	9.88	NO DATA	1010.85	13.876	-0.595	-0.497	0.712	0.810

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	13.378	14.588	14.686	9.188E-03	79.86	7.507E-03	12.146	15.209	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.014 AT GHM	MOMENTUM FLUX (Nt/m2) -2.04E-01	FRICTION VELOCITY (Meters/sec) 4.079E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.664E-01	AIR DENSITY (Kg/m3) 1.2239
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.03E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.077E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.033E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT GHM -0.018	LAT.HEAT FLUX (Watts/m2) 9.96E 01	SCALING POT.TEMP. (Kelvin) -1.731E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.061E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8980E 05
Z/L AT 10 METERS -0.014	SEN.HEAT FLUX (Watts/m2) 8.74E 00	ROUGHNESS LENGTH (Meters) 2.397E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.830
MONIN-OBUKHOV LENGTH (Meters) -7.027E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.26E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.360E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.195E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.18E 02			BAR PRES.AT WT LEVEL (Millibar) 1012.05
	BOWEN RATIO (no units) 0.088			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-"

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP	ROUGH LENGTH	DRAG COFF
87%	97%	76%	52%	65%	5%	42%	117%	38%	14%	27%	58%	76%
231%	231%	46%	42%	159%	5%	14%	201%	23%	65%	182%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905011700  
 START TIME: 17: 2:10 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) 0.005 (0.02) AT GHM	MOMENTUM FLUX (Nt/m2) -2.54E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.523E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.68E-04 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) 5.289E-04 (3.0E-05)
Z/L AT GHM 0.006 (0.02)	LAT.HEAT FLUX (Watts/m2) -4.16E 02 (2.0E+01)	SCALING POT.TEMP. (Kelvin) 2.028E-02 (2.0E-02)
Z/L AT 10 METERS 0.005 (0.02)	SEN.HEAT FLUX (Watts/m2) -9.40E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.799E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 2.112E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.26E 02 (2.0E+01)	DRAG COEF.AT 10 METERS (Meters) 1.671E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.07E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.042 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP	ROUGH LENGTH	DRAG COEFF
71%	73%	27%	138%	148%	8%	161%	46%	13%	83%	133%	44%	71%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905011930  
START TIME: 19:30: 0 PST  
END TIME: 19:59:50 PST  
START DATE: 0 May 1979 (DAY 120)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.991	5.022	7.066	6.551	4.679	-0.092	4.960

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.934	3.888	2.515	1.115	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128346	1421 129218	0.183	105	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
42	0	180	0	0	0	0	0	115.1	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.835	13.58	9.49	NO DATA	313.6	1010.00	1.28E 01	13.577	286.038

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
12.922	12.18	9.61	NO DATA	0.06	1011.09

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	13.014	14.106	14.286	8.956E-03	80.08	7.311E-03	11.820	14.760	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	13.012	14.204	14.294	9.034E-03	80.26	7.370E-03	11.927	14.861	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905011930  
START TIME: 19:30: 0 PST  
START DATE: 0 May 1979 (DAY 120)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATION BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.001 AT GMH	MOMENTUM FLUX (Nt/m2) -8.18E-01	FRICTION VELOCITY (Meters/sec) 8.170E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$ (Z1=Z2) 1/2	GENERAL FORM: $N=SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 6.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.287E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.56E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 4.90E-01
Z/L AT GMH -0.002	LAT. HEAT FLUX (Watts/m2) 1.56E 02	SCALING POT. TEMP. (Kelvin) -6.287E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.60E 03
Z/L AT 10 METERS -0.001	SEN. HEAT FLUX (Watts/m2) 6.37E 00	ROUGHNESS LENGTH (Meters) 2.115E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.60E 01
Z/L AT Z2 -0.001	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 4.137. 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -7.750E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.75E 02			
PSI1 AT Z1 = 0.008773 PSI1 AT Z2 = 0.004422 PSI2 AT Z1 = 0.005280 PSI2 AT Z2 = 0.002658	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2254

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kcl.

AIR SPECIFIC HEAT (J/Kcl. /Kg Kel.)
2.4159E 02

WATER LAT. HEAT VAP. (J/Kcl. /Kg)
5.9003E 05



RUN NUMBER: 7905011930  
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MARINE SURFACE LAYER  
 NRL MICROMETEDROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEDROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.911	12.35	9.59	NO DATA	1011.00	13.577	-0.666	-0.568	0.614	0.712

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABB.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	13.009	14.192	14.290	9.025E-03	80.24	7.363E-03	11.914	14.849	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.011 AT GHM	MOMENTUM FLUX (Nt/m2) -2.70E-01	FRICTION VELOCITY (Meters/sec) 4.694E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.204E-01	AIR DENSITY (Kg/m3) 1.2257
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.42E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.676E-05	WITH ABB. HUMIDITY (Meter Kg/sec m3) 4.417E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4159E 02
Z/L AT GHM -0.015	LAT.HEAT FLUX (Watts/m2) 1.09E 02	SCALING POT.TEMP. (Kelvin) -1.801E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.455E-03	WATER LAT.HEAT VAP. (Jtcal./Kg) 5.9001E 05
Z/L AT 10 METERS -0.011	SEN.HEAT FLUX (Watts/m2) 1.05E 01	ROUGHNESS LENGTH (Meters) 3.887E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.528
MONIN-OBUKHOV LENGTH (Meters) -8.932E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.445E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.32E 02			BAR.PRES.AT WT LEVEL (Millibar) 1012.20
	BOWEN RATIO (no units) 0.096			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
151%	151%	67%	141%	141%	10%	126%	282%	33%	108%	108%	53%	67%
218%	218%	46%	43%	146%	10%	37%	189%	23%	66%	169%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905011930  
 START TIME: 19:30: 0 PST  
 START DATE: 0 May 1979 (DAY 120)

MARINE SURFACE LAYER  
 NRL MICROMETEDROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.005 (0.02) AT GHM	MOMENTUM FLUX (Nt/m2) -4.94E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 6.112E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.85E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) -7.149E-05 (3.0E-05)
Z/L AT GHM -0.007 (0.02)	LAT.HEAT FLUX (Watts/m2) 1.20E 02 (2.0E+01)	SCALING POT.TEMP. (Kelvin) -1.083E-02 (2.0E-02)
Z/L AT 10 METERS -0.005 (0.02)	SEN.HEAT FLUX (Watts/m2) 8.39E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.159E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.869E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 (2.0E+01)	DRAG COEF.AT 10 METERS (Meters) 2.444E 03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.42E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.074 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	25%	56%	22%	25%	0%	17%	35%	29%	10%	30%	75%	57%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905012000  
START TIME: 20: 0: 0 PST  
END TIME: 20:30:10 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.970	4.999	6.963	6.510	4.693	-0.093	4.875

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.883	3.895	2.516	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 127942	1421 128810	0.183	106	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(Ne.).005V	B(Ne.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCL " THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.794	13.38	9.36	NO DATA	310.7	1010.21	1.29E 01	13.528	285.998

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.881	12.11	9.47	NO DATA	0.05	1011.31

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	U.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S.VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Kel.xM-2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.974	14.054	14.234	8.882E-03	79.61	7.249E-03	11.722	14.724	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	U.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S.VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Kel.xM-2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.971	14.151	14.241	8.954E-03	79.73	7.302E-03	11.820	14.824	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905012000  
START TIME: 20: 0: 0 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.001 AT GHM	MOMENTUM FLUX (Nt/m2) -6.84E-01	FRICTION VELOCITY (Meters/sec) 7.470E-01	GENERAL FORM: DN/DZ= [N1-N2]/[Ln(Z1/Z2)]* (Z1*Z2)1/2	GENERAL FORM: 'N' SLOPE= [Ln(Z1-PSI)]-[Ln(Z2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.76E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.292E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.43E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 5.35E-01
Z/L AT GHM -0.002	LAT. HEAT FLUX (Watts/m2) 1.42E 02	SCALING POT. TEMP. (Kelvin) -6.292E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.59E 03
Z/L AT 10 METERS -0.002	SEN. HEAT FLUX (Watts/m2) 5.83E 00	ROUGHNESS LENGTH (Meters) 1.680E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.59E 01
Z/L AT Z1 -0.003	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAG COEF. AT 10 METERS (Dimensionless) 3.56E-03		N=Ln TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.001	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.61E 02			
MONIN-ORUKHOV LENGTH (Meters) -6.475E 03	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1= 0.010490 PSI1 AT Z2= 0.005293 PSI2 AT Z1= 0.006317 PSI2 AT Z2= 0.003182				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08F-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2259

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4157E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9005E 05

RUN NUMBER: 7905012000  
 START TIME: 20: 01: 0 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.071	12.26	9.46	NO DATA	1011.21	13.528	-0.658	-0.560	0.611	0.709

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.969	14.139	14.237	8.945E-03	79.72	7.295E-03	11.808	14.813	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.011 AT GMH	MOMENTUM FLUX (Nt/m2) -2.65E-01	FRICTION VELOCITY (Meters/sec) 4.651E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.163E-01	AIR DENSITY (Kg/m3) 1.2262
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.46E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.819E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.459E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4158E 02
Z/L AT GMH -0.015	LAT.HEAT FLUX (Watts/m2) 1.10E 02	SCALING POT.TEMP. (Kelvin) -1.787E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.313E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9803E 05
Z/L AT 10 METERS -0.011	SEN.HEAT FLUX (Watts/m2) 1.03E 01	ROUGHNESS LENGTH (Meters) 3.765E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.481
MONIN-OBUKHOV LENGTH (Meters) -8.833E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.439E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.33E 02			BAR.PRES.AT WT LEVEL (Millibar) 1012.41
	BOWEN RATIO (no units) 0.094			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC. HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
156%	156%	72%	144%	144%	10%	127%	287%	36%	108%	108%	56%	72%
219%	219%	46%	43%	147%	10%	37%	190%	23%	66%	170%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905012000  
 START TIME: 20: 01: 0 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.006 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -4.29E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 5.754E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.76E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.242E-05 [3.0E-05]
Z/L AT GMH -0.007 [0.02]	LAT.HEAT FLUX (Watts/m2) 1.10E 02 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.078E-02 [2.0E-02]
Z/L AT 10 METERS -0.006 [0.02]	SEN.HEAT FLUX (Watts/m2) 8.04E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 9.439E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.784E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 2.203E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.40E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.073 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC. HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	25%	50%	16%	28%	0%	11%	34%	25%	11%	30%	70%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905012030  
START TIME: 20:30:20 PST  
END TIME: 21:00:30 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 4.946	No.04 DEW POINT2 4.978	No.05 WIND SPEED1 6.449	No.06 WIND SPEED2 6.079	No.07 BAR.PRES.2 4.706	No.08 SKY RAD. -0.092	No.09 WIND DIR. 4.862
No.10 BULK WT TEMP 3.827	No.11 AC FREQUENCY 3.885	No.12 AC VOLTAGE 2.510	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 128102	No.2 AIR TEMP.2 1421 128926	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 102	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTRFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).75V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 59.89
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.810	WIND SPEED1 (Meter/sec) 12.40	DEW POINT1 (Celsius) 9.22	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 310.3	BAR.PRES.1 (Millibar) 1010.41	SKY RAD. (Watt/m2) 1.29E 01	BULK WT TEMP (Celsius) 13.474	MEAN AIR TEMP (Kelvin) 286.011
AIR TEMP.2 (Celsius) 12.893	WIND SPEED2 (Meter/sec) 11.31	DEW POINT2 (Celsius) 9.35	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.10	BAR.PRES.2 (Millibar) 1011.51			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.990	VIR.TEMP.1 (Celsius) 14.058	V.POT.TEMP.1 (Celsius) 14.238	ABS.HUMID.1 (Kg/m3) 8.797E-03	REL.HUMID.1 (Percent) 78.75	SPEC.HUMID.1 (Kg/Kg) 7.178E-03	VAP.PRES.1 (Millibar) 11.610	S.VAP.PRES.1 (Millibar) 14.743	REF.INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.983	VIR.TEMP.2 (Celsius) 14.152	V.POT.TEMP.2 (Celsius) 14.242	ABS.HUMID.2 (Kg/m3) 8.883E-03	REL.HUMID.2 (Percent) 79.03	SPEC.HUMID.2 (Kg/Kg) 7.242E-03	VAP.PRES.2 (Millibar) 11.727	S.VAP.PRES.2 (Millibar) 14.838	REF.INDEX 2 (Kel.xM-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905012030  
START TIME: 20:30:20 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.002 AT GHM	MOMENTUM FLUX (Nt/m2) -4.96E-01	FRICTION VELOCITY (Meters/sec) 6.361E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[Ln(Z1/Z2)* (Z1*Z2)^(1/2)]	GENERAL FORM: 'N' SLOPE= [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 4.92E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.303E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.21E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PS1=PS11 WS SLOPE= 6.27E-01
Z/L AT GHM -0.003	LAT.HEAT FLUX (Watts/m2) 1.21E 02	SCALING POT. TEMP. (Kelvin) -6.303E-03	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PS1=PS12 SH SLOPE= -8.58E 03
Z/L AT 10 METERS -0.002	SEN.HEAT FLUX (Watts/m2) 4.97E 00	ROUGHNESS LENGTH (Meters) 1.051E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PS1=PS12 PTK SLOPE= -8.58E 01
Z/L AT Z1 -0.004	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAG COEF. AT 10 METERS (Dimensionless) 5.049E-03		N=LnTEMP.STRUC.(Kel.xM-2/3) Z=HEIGHT (M) Vert.Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.002	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.39E 02			
MONIN-ORUKHOU LENGTH (Meters) -4.678E 03	BOWEN RATIO (no units) 0.041			
PS11 AT Z1= 0.014447 PS11 AT Z2= 0.007308 PS12 AT Z1= 0.008711 PS12 AT Z2= 0.004396				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR.PRANDTL NUMBER 0.74	PROFILE TUR.SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF.COEF. 0.92E-03	BULK MOISTURE TRANSF.COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2262

AIR SPECIFIC HEAT  
(Itcal./Kg Kel.)  
2.4156E 02

WATER LAT HEAT VAP.  
(Itcal./Kg)  
5.9005E 05

RUN NUMBER: 7905012030  
 START TIME: 20:30:20 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.883	11.45	9.33	NO DATA	1011.41	13.474	-0.591	-0.493	0.667	0.765

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.981	14.141	14.239	8.873E-03	78.99	7.235E-03	11.713	14.827	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -2.23E-01	FRICTION VELOCITY (Meters/sec) 4.260E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.815E-01	AIR DENSITY (Kg/m3) 1.2264
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.22E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.072E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.217E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4156E 02
Z/L AT GMH -0.017	LAT. HEAT FLUX (Watts/m2) 1.04E 02	SCALING POT. TEMP. (Kelvin) -1.689E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.195E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9003E 05
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 8.92E 00	ROUGHNESS LENGTH (Meters) 2.786E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.430
MONIN-OBUKHOV LENGTH (Meters) -7.844E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.385E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.61
	BOWEN RATIO (no units) 0.086			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
161%	161%	77%	147%	147%	10%	128%	294%	39%	108%	108%	59%	77%
231%	231%	46%	42%	159%	10%	37%	202%	23%	65%	182%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905012030  
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 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.006 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -3.24E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 5.043E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.37E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.406E-05 (3.8E-05)
Z/L AT GMH -0.008 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.08E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.024E-02 (2.0E-02)
Z/L AT 10 METERS -0.006 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.87E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.852E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.540E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.95E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.29E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.067 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
27%	27%	43%	9%	29%	0%	6%	28%	21%	12%	27%	65%	45%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905012100  
START TIME: 21: 0:40 PST  
END TIME: 21:30:50 PST  
START DATE: 1 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.918	4.951	6.806	6.380	4.692	-0.093	4.896

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.770	3.882	2.510	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126566	1421 127461	0.183	98	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.657	13.08	9.06	NO DATA	311.5	1010.20	1.29E 01	13.418	285.861

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.746	11.87	9.19	NO DATA	0.16	1011.30

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S.VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.836	13.890	14.070	8.705E-03	78.69	7.100E-03	11.482	14.592	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S.VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.836	13.991	14.081	8.789E-03	78.92	7.163E-03	11.597	14.694	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905012100  
START TIME: 21: 0:40 PST  
START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.002 AT GMH	MOMENTUM FLUX (Nt/m2) -6.19E-01	FRICITION VELOCITY (Meters/sec) 7.103E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/(Ln(Z1/Z2)) (Z1*Z2)1/2	GENERAL FORM: N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.48E-03	SCALING SPEC. HUMD. (Kg/Kg) -6.295E-03	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.36E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 5.63E-01
Z/L AT GMH -0.002	LAT. HEAT FLUX (Watts/m2) 1.36E 02	SCALING POT. TEMP. (Kelvin) -6.295E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.59E 03
Z/L AT 10 METERS -0.002	SEN. HEAT FLUX (Watts/m2) 5.55E 00	ROUGHNESS LENGTH (Meters) 1.460E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.59E 01
Z/L AT Z1 -0.003	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAW COEF. AT 10 METERS (Dimensionless) 3.388E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.002	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.54E 02			
MONIN-OBUKHOV LENGTH (Meters) -5.845E 03	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1= 0.011603 PSI1 AT Z2= 0.005859 PSI2 AT Z1= 0.006990 PSI2 AT Z2= 0.003523				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2266
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4154E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9013E 05

RUN NUMBER: 7905012100  
 START TIME: 21: 0:40 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.735	12.01	9.17	NO DATA	1011.20	13.418	-0.683	-0.585	0.561	0.659

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.833	13.979	14.077	8.779E-03	78.90	7.156E-03	11.583	14.682	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.012 AT GMM	MOMENTUM FLUX (Nt/m2) -2.52E-01	FRICTION VELOCITY (Meters/sec) 4.532E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.054E-01	AIR DENSITY (Kg/m3) 1.2269
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.51E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.187E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.508E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
Z/L AT GMM -0.016	LAT. HEAT FLUX (Watts/m2) 1.11E 02	SCALING POT. TEMP. (Kelvin) -1.867E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.462E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9011E 05
Z/L AT 10 METERS -0.012	SEN. HEAT FLUX (Watts/m2) 1.05E 01	ROUGHNESS LENGTH (Meters) 3.447E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.370
MONIN-OBUKHOV LENGTH (Meters) -8.026E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.423E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.162E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.35E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.41
	BOWEN RATIO (no units) 0.094			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
157%	157%	73%	145%	145%	10%	127%	289%	37%	108%	108%	57%	73%
216%	216%	46%	42%	144%	10%	37%	186%	23%	65%	167%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905012100  
 START TIME: 21: 0:40 PST  
 START DATE: 1 May 1979 (DAY 121)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.006 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -3.93E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 5.523E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.73E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.425E-05 [3.0E-05]
Z/L AT GMM -0.008 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.17E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.116E-02 [2.0E-02]
Z/L AT 10 METERS -0.006 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.03E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.257E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.600E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.29E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 2.116E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.39E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.073 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
27%	27%	48%	12%	31%	0%	8%	34%	24%	13%	32%	68%	41%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021330  
START TIME: 13:30: 0 PST  
END TIME: 13:59:59 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.088	5.108	5.453	5.317	4.799	4.185	4.754
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.183	3.863	2.527	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 130215	1421 131389	0.157	110	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.022	10.50	10.06	NO DATA	306.6	1011.83	-5.84E 02	13.821	286.240
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
13.139	9.99	10.12	NO DATA	0.01	1012.93			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.201	14.344	14.524	9.319E-03	82.22	7.600E-03	12.307	14.969	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.229	14.467	14.557	9.362E-03	81.91	7.630E-03	12.369	15.101	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021330  
START TIME: 13:30: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.032 AT GHM	MOMENTUM FLUX (Nt/m2) -1.38E-01	FRICTION VELOCITY (Meters/sec) 3.353E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2) * (Z1+Z2)1/2]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1) - (LnZ2-PS1)] / (LN1-LN2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)1/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.78E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.748E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.73E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 1.19E 00
Z/L AT GHM -0.040	LAT. HEAT FLUX (Watts/m2) 6.85E 01	SCALING POT. TEMP. (Kelvin) -2.340E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -8.01E 03
Z/L AT 10 METERS -0.031	SEN. HEAT FLUX (Watts/m2) 9.74E 00	ROUGHNESS LENGTH (Meters) 1.202E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.09E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -2.31E 01
Z/L AT Z1 -0.056	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.84E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.214E-03		
Z/L AT Z2 -0.028	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.05E 02			
MONIN-OBUKHOV LENGTH (Meters) -3.253E 02	BOWEN RATIO (no units) 0.142			
PS11 AT Z1= 0.171438 PS11 AT Z2= 0.094377 PS12 AT Z1= 0.107901 PS12 AT Z2= 0.058297				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2266
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.8992E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905021330  
 START TIME: 13:30: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.125	10.05	10.12	NO DATA	1012.84	13.021	-0.696	-0.598	0.632	0.730

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	13.223	14.452	14.550	9.357E-03	81.95	7.627E-03	12.362	15.085	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 AT GHM	MOMENTUM FLUX (Nt/m2) -1.60E-01	FRICTION VELOCITY (Meters/sec) 3.615E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.307E-01	AIR DENSITY (Kg/m3) 1.2268
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.707E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.418E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GHM -0.028	LAT. HEAT FLUX (Watts/m2) 8.44E 01	SCALING POT. TEMP. (Kelvin) -2.083E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.529E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8989E 05
Z/L AT 10 METERS -0.022	SEN. HEAT FLUX (Watts/m2) 9.35E 00	ROUGHNESS LENGTH (Meters) 1.571E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.804
MONIN-OBUKHOV LENGTH (Meters) -4.585E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.84E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.293E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.193E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.90E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.84
	BOWEN RATIO (no units) 0.111			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
140%	140%	128%	173%	101%	5%	19%	274%	64%	108%	37%	84%	128%
214%	214%	46%	44%	142%	5%	7%	185%	23%	67%	165%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021330  
 START TIME: 13:30: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.028 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -1.54E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.546E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.29E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.342E-05 [3.0E-05]
Z/L AT GHM -0.035 [0.02]	LAT. HEAT FLUX (Watts/m2) 8.12E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.293E-02 [2.0E-02]
Z/L AT 10 METERS -0.027 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.57E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.446E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.677E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.84E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.27E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.94E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.123 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
18%	17%	8%	11%	2%	0%	2%	13%	4%	7%	7%	13%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905021400  
START TIME: 14: 0: 0 PST  
END TIME: 14:30:10 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	HAR. PRES. 1	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.064	5.085	5.269	5.096	4.792	5.320	4.851

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.162	3.859	2.525	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1/CAL	DP2/CAL	WIND CAL	WIND CAL	WIND CAL	WIND CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.129651	1421.130746	0.157	106	-0.009	0.000	0.004	0.004	0.004	0.004

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	11.13	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR	HAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.965	10.15	9.92	NO DATA	389.9	1011.73	-4.63E-02	13.880	286.180

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	HAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Meter MSL)	(Millibar)
13.075	9.58	9.99	NO DATA	0.08	1012.83

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REL. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
18.35	13.145	14.275	14.454	9.231E-03	81.74	7.528E-03	12.189	14.912	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REL. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
9.20	13.165	14.390	14.481	9.278E-03	81.51	7.561E-03	12.255	15.076	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021400  
START TIME: 14: 0: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.019 AT GHM	MOMENTUM FLUX (Nt/m2) -1.55E-01	FRICTION VELOCITY (Meters/sec) 3.554E-01	GENERAL FORM DN/DZ (N1-N2)/(ln(Z1/Z2)) (Z1*Z2)/(Z1)	GENERAL FORM N SLOPE (ln(Z1/PS1)-(ln(Z2/PS1)))/(N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GHM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.87E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.574E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= -6.33E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE= -1.13E-06
Z/L AT GHM -0.024	LAT. HEAT FLUX (Watts/m2) 7.0HE 01	SCALING POT. TEMP. (Kelvin) -1.630E-02	N=SPEC HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC HUMIDITY (kg/kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE= -8.21E-03
Z/L AT 10 METERS -0.019	SIN. HEAT FLUX (Watts/m2) 7.19E 00	ROUGHNESS LENGTH (Meters) 1.479E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.21E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE= -3.31E-01
Z/L AT Z1 -0.034	SLY AND SOLAR HEAT FLUX (Watts/m2) -4.63E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.47E-04		N=LAT. TEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert Axis PS1=NONE LTD SLOPE=NO DATA
Z/L AT Z2 0.017	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.85E 02			
MUNIN-BROKHOF LENGTH (Meters) -5.403E 02	BOWEN RATIO (no units) 0.102			
PS11 AT Z1= 0.111049 PS11 AT Z2= 0.059320 PS12 AT Z1= 0.068897 PS12 AT Z2= 0.036280				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7979	PROFILE THER. PRANDTL NUMBER 0.74	PROFILE THER. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2268

AIR SPECIFIC HEAT  
(J/cal. (Kg Kel.))  
2.4163E 02

WATER LAT. HEAT VAP  
(J/cal. (Kg))  
5.8495E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation exhibited by insertion of:

SHI SHZ +/- .001 3 kg/Kg

RUN NUMBER: 7905021400  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
13.061	9.65	9.98	NO DATA	1012.73	13.800	-0.739	-0.641	0.576	0.674

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.159	14.376	14.474	9.272E-03	81.54	7.557E-03	12.248	15.021	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCEL ANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.027 AT GMH	MOMENTUM FLUX (Nt/m2) -1.45E-01	FRICTION VELOCITY (Meters/sec) 3.435E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.180E-01	AIR DENSITY (Kg/m3) 1.2270
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.37E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.992E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.369E-05	AIR SPECIFIC HEAT (J/Kg Kel) 2.4163E 02
Z/L AT GMH -0.034	LAT. HEAT FLUX (Watts/m2) 8.32E 01	SCALING POT. TEMP. (Kelvin) -2.238E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.689E-03	WATER LAT. HEAT VAP (J/Kg) 5.8993E 05
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 9.55E 00	ROUGHNESS LENGTH (Meters) 1.311E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.781
MONIN-OBUKHOV LENGTH (Meters) -3.851E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.63E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.267E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.192E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.70E 02			BAR. PRES. AT WT LEVEL (Millibar) 1113.93
	BOWEN RATIO (no units) 0.115			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
138%	138%	113%	164%	104%	5%	22%	269%	56%	108%	48%	76%	113%
208%	208%	46%	43%	136%	5%	8%	179%	23%	66%	159%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021400  
 START TIME: 14: 0: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.48E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.470E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.26E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.452E-05 [3.0E-05]
Z/L AT GMH -0.028 [0.02]	LAT. HEAT FLUX (Watts/m2) 8.06E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.771E-02 [2.0E-02]
Z/L AT 10 METERS -0.021 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.21E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.371E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.656E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.63E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.320E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.74E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.109 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
19%	18%	4%	9%	14%	8%	2%	6%	2%	10%	17%	6%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021430  
START TIME: 14:30:20 PST  
END TIME: 15:00:30 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 5.205	No. 01 TEMP. STRUCT. 1 0.000	No. 02 TEMP. STRUCT. 2 0.001	No. 03 DEW POINT 1 5.069	No. 04 DEW POINT 2 5.088	No. 05 WIND SPEED 1 5.034	No. 06 WIND SPEED 2 4.884	No. 07 BAR. PRES. 2 4.792	No. 08 SKY RAD. 2.369	No. 09 WIND DIR. 4.768
No. 10 BULK WT. TEMP. 4.147	No. 11 AC FREQUENCY 3.856	No. 12 AC VOLTAGE 2.527	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411.128802	No. 2 AIR TEMP. 2 1421.129825	UPWIND NEAR HEIGHT/LENGTH 0.152	UPWIND LAND PATH (Meters) 103	DPTFCAL (Volts) -0.009	DPTFCAL (Volts) 0.000	WTRFCAL (Volts) 0.000	WS1EC (Coeff.) 0.993	WS2EC (Coeff.) 0.959
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV A (No. .005V) 0	VOLT. REF. DEV B (No. .005V) 0	ZERO REF. DEV (No. .002V) 0	AC VOLT. FLUX (No. .5V) 0	AC FREQ. FLUX (No. .1Hz) 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.86
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 12.880	WIND SPEED 1 (Meter/sec) 4.70	DEW POINT 1 (Celsius) 2.97	TEMP. STRUCT. 1 (Kelvin-M/2/3) NO DATA	WIND DIR. (Deg. True) 307.1	BAR. PRES. 1 (Millibar) 1011.73	SKY RAD. (Millibar) -3.30E-02	BULK WT. TEMP. (Celsius) 13.785	MEAN AIR TEMP. (Kelvin) 286.091
AIR TEMP. 2 (Celsius) 12.983	WIND SPEED 2 (Meter/sec) 4.19	DEW POINT 2 (Celsius) 10.01	TEMP. STRUCT. 2 (Kelvin-M/2/3) NO DATA	TIDE TABLE (Meter MSL) 0.13	BAR. PRES. 2 (Millibar) 1012.83			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 13.060	VIR. TEMP. 1 (Celsius) 14.192	V. POT. TEMP. 1 (Celsius) 14.372	ABS. HUMID. 1 (Kg/m3) 9.252E-03	REL. HUMID. 1 (Percent) 82.36	SPEC. HUMID. 1 (Kg/Kg) 7.543E-03	VAP. PRES. 1 (Millibar) 12.214	S. VAP. PRES. 1 (Millibar) 14.830	REF. INDEX 1 (Kelvin-M/2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 13.073	VIR. TEMP. 2 (Celsius) 14.380	V. POT. TEMP. 2 (Celsius) 14.390	ABS. HUMID. 2 (Kg/m3) 9.293E-03	REL. HUMID. 2 (Percent) 82.11	SPEC. HUMID. 2 (Kg/Kg) 7.571E-03	VAP. PRES. 2 (Millibar) 12.271	S. VAP. PRES. 2 (Millibar) 14.945	REF. INDEX 2 (Kelvin-M/2/3) NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021430  
START TIME: 14:30:20 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 AT GMH	MOMENTUM FLUX (Nt/m2) -1.22E-01	FRICTION VELOCITY (Meters/sec) 3.156E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] = (Z1/Z2)^(1/2)	GENERAL FORM: N SLOPE = [(Ln Z1 - PSI1) - (Ln Z2 - PSI1)] / (N1 - N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.52E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.516E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 5.70E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.27E 00
Z/L AT GMH -0.019	LAT. HEAT FLUX (Watts/m2) 4.23E 01	SCALING POT. TEMP. (Kelvin) -1.033E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.30E 03
Z/L AT Z1 -0.027	SIN. HEAT FLUX (Watts/m2) 4.05E 00	ROUGHNESS LENGTH (Meters) 9.665E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.41E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -5.23E 01
Z/L AT Z2 0.014	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.30E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.17E -05		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MINIM. DRAG COEF. LENGTH (Meters) -6.707E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.64E 02			
PSI1 AT Z1 = 0.090619 PSI1 AT Z2 = 0.047895 PSI2 AT Z1 = 0.055931 PSI2 AT Z2 = 0.029192	BOWEN RATIO (no units) 0.065			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION (M/sec. 2) 9.7979	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2272

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computations executed by insertion of:

SH1 SH2 +/- 0.01 3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9000E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905021430  
 START TIME: 14:30:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.970	9.25	10.00	NO DATA	1012.73	13.785	-0.815	-0.717	0.501	0.599

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.068	14.287	14.385	9.288E-03	82.14	7.567E-03	12.265	14.932	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.034 AT GMH	MOMENTUM FLUX (Nt/m2) -1.30E-01	FRICTION VELOCITY (Meters/sec) 3.259E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.062E-01	AIR DENSITY (Kg/m3) 1.2274
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.992E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.197E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.042	LAT. HEAT FLUX (Watts/m2) 7.90E 01	SCALING POT. TEMP. (Kelvin) -2.487E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.104E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8998E 05
Z/L AT 10 METERS -0.032	SEN. HEAT FLUX (Watts/m2) 1.01E 01	ROUGHNESS LENGTH (Meters) 1.086E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.766
MONIN-OBUKHOV LENGTH (Meters) -3.119E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.30E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.241E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.41E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.93
	ROSEN RATIO (no units) 0.127			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
167%	167%	122%	170%	133%	5%	27%	303%	61%	109%	72%	81%	122%
200%	200%	46%	43%	128%	5%	10%	171%	23%	66%	151%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021430  
 START TIME: 14:30:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.023 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.28E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.231E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.06E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.434E-05 [3.0E-05]
Z/L AT GMH -0.029 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.56E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.504E-02 [2.0E-02]
Z/L AT 10 METERS -0.023 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.12E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.044E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.422E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.30E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Dimensionless) 1.241E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.47E 02 [3.0E+01]	
	ROSEN RATIO (no units) 0.105 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
40%	38%	3%	13%	42%	0%	5%	31%	2%	10%	39%	6%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021500  
START TIME: 15: 040 PST  
END TIME: 15:30:50 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.094	No.04 DEW POINT2 5.114	No.05 WIND SPEED1 5.420	No.06 WIND SPEED2 5.227	No.07 BAR.PRES.2 4.769	No.08 SKY RAD. 2.398	No.09 WIND DIR. 4.777
No.10 BULK WT TEMP 4.150	No.11 AC FREQUENCY 3.891	No.12 AC VOLTAGE 2.530	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 128945	No.2 AIR TEMP.2 1421 130001	UPWIND NEAR HEIGHT/LENGTH 0.157	UPWIND LAND PATH(Meters) 101	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.993	WS2EC (Coeff.) 0.959
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).15V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.89
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.894	WIND SPEED1 (Meter/sec) 10.44	DEW POINT1 (Celsius) 10.10	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 307.4	BAR.PRES.1 (Millibar) 1011.38	SKY RAD. (Watt/m2) -3.34E 02	BULK WT TEMP (Celsius) 13.789	MEAN AIR TEMP (Kelvin) 286.107
AIR TEMP.2 (Celsius) 13.000	WIND SPEED2 (Meter/sec) 9.82	DEW POINT2 (Celsius) 10.16	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.16	BAR.PRES.2 (Millibar) 1012.47			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 13.074	VIR.TEMP.1 (Celsius) 14.220	V.POT.TEMP.1 (Celsius) 14.400	ABS.HUMID.1 (Kg/m3) 9.342E-03	REL.HUMID.1 (Percent) 83.12	SPEC.HUMID.1 (Kg/Kg) 7.620E-03	VAP.PRES.1 (Millibar) 12.333	S.VAP.PRES.1 (Millibar) 14.838	REF.INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 13.090	VIR.TEMP.2 (Celsius) 14.331	V.POT.TEMP.2 (Celsius) 14.421	ABS.HUMID.2 (Kg/m3) 9.386E-03	REL.HUMID.2 (Percent) 82.87	SPEC.HUMID.2 (Kg/Kg) 7.650E-03	VAP.PRES.2 (Millibar) 12.396	S.VAP.PRES.2 (Millibar) 14.958	REF.INDEX 2 (Kel.xM-2/3) NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021500  
START TIME: 15: 040 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -1.75E-01	FRICTION VELOCITY (Meters/sec) 3.779E-01	GENERAL FORM: DN/DZ= [(N1-N2)/((Ln(Z1/Z2))^2 (Z1*Z2)^1/2)]	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)^1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.01E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.485E-05	N=WIND SPEED (N/sec) Z=HEIGHT (Meters) DWS/DZ= 6.87E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.86E 00
Z/L AT GMH -0.017	LAT.HEAT FLUX (Watts/m2) 7.43E 01	SCALING POT. TEMP. (Kelvin) -1.297E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -8.31E 03
Z/L AT 10 METERS -0.013	SFN.HEAT FLUX (Watts/m2) 6.08E 00	ROUGHNESS LENGTH (Meters) 1.836E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.78E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -4.17E 01
Z/L AT Z1 -0.024	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.34E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.562E-03		N=LnTEMP.STRUC.(K.xM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CTD SLOPE=NO DATA
Z/L AT Z2 -0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.54E 02			
MOMIN-OBUKHOV LENGTH (Meters) -7.792E 02	BOWEN RATIO (no units) 0.082			
PSI1 AT Z1= 0.079985 PSI1 AT Z2= 0.042022 PSI2 AT Z1= 0.049212 PSI2 AT Z2= 0.025566				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR.PRANDTL NUMBER 0.74	PROFILE TUR.SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF.COEF. 0.92E-03	BULK MOISTURE TRANSF.COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2266

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.8999E 05

\* CONTINUED ON NEXT PAGE

START TIME: 15: 0:40 PST  
START DATE: 2 May 1979 (DAY 122)

NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1979  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.987	9.90	10.15	NO DATA	1012.38	13.789	-0.801	-0.703	0.529	0.627

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	13.085	14.318	14.416	9.381E-03	82.90	7.646E-03	12.389	4.944	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.027 AT GMH	MOMENTUM FLUX (Nt/m2) -1.54E-01	FRICTION VELOCITY (Meters/sec) 3.546E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.258E-01	AIR DENSITY (Kg/m3) 1.2269
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.577E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.296E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMH -0.034	LAT. HEAT FLUX (Watts/m2) 8.14E 01	SCALING POT. TEMP. (Kelvin) -2.370E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.406E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8997E 05
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 1.04E 01	ROUGHNESS LENGTH (Meters) 1.467E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.764
MONIN-OBUKHOV LENGTH (Meters) -3.874E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.34E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.283E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.43E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.58
	BOWEN RATIO (no units) 0.128			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
142%	142%	107%	161%	111%	5%	29%	273%	54%	108%	58%	74%	107%
201%	201%	46%	44%	129%	5%	10%	173%	23%	67%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021500  
START TIME: 15: 0:40 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.019 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.61E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.616E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.23E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.159E-05 (3.0E-05)
Z/L AT GMH -0.024 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.99E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.592E-02 (2.0E-02)
Z/L AT 10 METERS -0.018 (0.02)	SEN. HEAT FLUX (Watts/m2) 8.10E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.603E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -3.493E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.34E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.354E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.46E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.110 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
35%	33%	7%	5%	27%	0%	3%	2%	3%	8%	29%	12%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021530  
START TIME: 15:31: 0 PST  
END TIME: 16: 1:10 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.087	5.107	4.469	4.285	4.800	1.379	4.796

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.115	3.879	2.525	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128756	1421 129726	0.157	99	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) (0.05V)	B(No.) (0.05V)	(No.) (0.02V)	(No.) (5V)	(No.) (Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.88

## \* DERIVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.876	8.62	10.06	NO DATA	308.0	1011.84	-1.92E 02	13.754	286.084

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIME TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.973	8.08	10.12	NO DATA	0.18	1012.94

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.055	14.197	14.377	9.321E-03	82.99	7.598E-03	12.384	14.827	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.063	14.300	14.390	9.365E-03	82.79	7.629E-03	12.367	14.937	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021530  
START TIME: 15:31: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.009 AT GMH	MOMENTUM FLUX (Nt/m2) -1.27E-01	FRICTION VELOCITY (Meters/sec) 3.212E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]$ (Z1=Z2)/2	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.53E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.417E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.94E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.25E 00
Z/L AT GMH -0.011	LAT. HEAT FLUX (Watts/m2) 6.25E 01	SCALING POT. TEMP. (Kelvin) -6.417E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.42E 03
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 2.56E 00	ROUGHNESS LENGTH (Meters) 1.031E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.42E 01
Z/L AT Z1 -0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.92E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.724E 03		
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.27E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.151E 03	BOWEN RATIO (no units) 0.041			N=Ln TEMP. STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1= 0.655799 PSI1 AT Z2= 0.028972 PSI2 AT Z1= 0.034091 PSI2 AT Z2= 0.817523				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.72E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- 0.0F-3 Kg/Kg.  
PTK1-PTK2= +/- 0.08 Kcl.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2273

AIR SPECIFIC HEAT  
(J/Kcl./Kg Kcl.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(J/Kcl./Kg)  
5.9008E 05



RUN NUMBER: 7905021530  
 START TIME: 15:31: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMA. MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	W. SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Mill. bar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.961	8.15	10.11	NO DATA	1012.85	13.754	-0.793	0.695	0.533	0.631

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	13.059	14.287	14.385	9.360E-03	82.81	7.625E-03	12.360	14.925	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.049 AT GMH	MOMENTUM FLUX (Nt/m2) -9.52E-02	FRICTION VELOCITY (Meters/sec) 2.785E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.754E-02	AIR DENSITY (Kg/m3) 1.2275
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.71E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.942E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.715E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMH -0.059	LAT. HEAT FLUX (Watts/m2) 6.71E 01	SCALING POT. TEMP. (Kelvin) -2.590E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.214E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8998E 05
Z/L AT 10 METERS -0.046	SEN. HEAT FLUX (Watts/m2) 8.96E 00	ROUGHNESS LENGTH (Meters) 6.095E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.736
MONTIN-ORUKHOV LENGTH (Meters) -2.186E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.92E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.168E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.188E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.16E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.05
	BOWEN RATIO (no units) 0.134			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
188%	88%	108%	164%	164%	5%	40%	327%	54%	110%	110%	74%	108%
207%	202%	46%	44%	130%	5%	12%	174%	23%	67%	153%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021530  
 START TIME: 15:31: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.020 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.05E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.913E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.68E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.366E-05 [3.0E-05]
Z/L AT GMH -0.034 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.61E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.457E-02 [2.0E-02]
Z/L AT 10 METERS -0.022 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.13E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.647E-05 [6.0E-05]
MONTIN-ORUKHOV LENGTH (Meters) -3.767E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.92E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.318E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.19E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.101 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
72%	70%	16%	4%	53%	0%	5%	48%	8%	11%	49%	29%	23%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905021600  
START TIME: 16: 1:20 PST  
END TIME: 16:31:30 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.076	5.096	4.771	4.615	4.703	1.414	4.949

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.072	3.867	2.524	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1FC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128434	1421 129407	0.183	97	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(V)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel.xM-2/3)
12.843	9.19	9.99	NO DATA	313.3	1011.60	-1.97E 02	13.712	286.052

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.941	8.63	10.05	NO DATA	0.18	1012.70

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.023	14.159	14.338	9.277E-03	82.78	7.563E-03	12.245	14.792	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.031	14.261	14.352	9.320E-03	82.57	7.593E-03	12.305	14.903	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021600  
START TIME: 16: 1:20 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.008 AT GMH	MOMENTUM FLUX (Nt/m2) -1.37E-01	FRICTION VELOCITY (Meters/sec) 3.345E-01	GENERAL FORM: DN/DZ= [(N1-N2)/Ln(Z1/Z2)] (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.63E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.405E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.20E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.20E 00
Z/L AT GMH -0.010	LAT. HEAT FLUX (Watts/m2) 6.49E 01	SCALING POT. TEMP. (Kelvin) -6.405E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.44E 03
Z/L AT Z1 -0.015	SEN. HEAT FLUX (Watts/m2) 2.66E 00	ROUGHNESS LENGTH (Meters) 1.192E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.44E 01
Z/L AT Z2 -0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.97E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.6/11 0.5		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-BRUKHOV LENGTH (Meters) -1.252E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.30E 02			
PSI1 AT Z1= 0.051559 PSI1 AT Z2= 0.026659 PSI2 AT Z1= 0.031480 PSI2 AT Z2= 0.016140	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2271

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(Jcal./kg)  
5.9002E 05

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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.929	8.70	10.04	NO DATA	1012.60	13.712	-0.783	-0.685	0.537	0.635

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel xM-2/3)
10.00	13.027	14.249	14.347	9.315E-03	82.60	7.589E-03	12.299	14.890	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.039 AT GMM	MOMENTUM FLUX (Nt/m2) -1.12E-01	FRICTION VELOCITY (Meters/sec) 3.018E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.189E-02	AIR DENSITY (Kg/m3) 1.2274
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.91E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.858E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.911E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMM -0.048	LAT. HEAT FLUX (Watts/m2) 7.19E 01	SCALING POT. TEMP. (Kelvin) -2.479E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.483E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9008E 05
Z/L AT 10 METERS -0.037	SEN. HEAT FLUX (Watts/m2) 9.29E 00	ROUGHNESS LENGTH (Meters) 8.218E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.689
MONIN-OBUKHOV LENGTH (Meters) -2.683E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.97E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.204E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.185E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.16E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.80
	BOWEN RATIO (no units) 0.129			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
190%	190%	110%	165%	165%	5%	41%	330%	55%	110%	110%	75%	110%
203%	203%	46%	44%	131%	5%	13%	175%	23%	67%	154%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021600  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.023 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -1.19E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.115E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.85E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.310E-05 (3.0E-05)
Z/L AT GMM -0.029 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.04E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.407E-02 (2.0E-02)
Z/L AT 10 METERS -0.022 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.35E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 9.568E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.517E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.97E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.31E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.19E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.099 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
68%	66%	12%	6%	53%	0%	6%	47%	6%	10%	47%	20%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021630  
START TIME: 16:31:40 PST  
END TIME: 17:11:50 ST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.RFF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.285	0.001	0.001	5.065	5.086	4.880	4.735	4.783	0.887	4.797
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.031	3.852	2.524	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF2CAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 127926	1421 128882	0.157	100	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.793	9.40	9.93	NO DATA	308.1	1011.58	-1.24E 02	13.672	286.000
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.888	8.91	9.99	NO DATA	0.17	1012.68			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.972	14.102	14.282	9.238E-03	82.69	7.530E-03	12.191	14.743	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.978	14.204	14.294	9.286E-03	82.54	7.564E-03	12.259	14.851	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021630  
START TIME: 16:31:40 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 AT GMH	MOMENTUM FLUX (Nt/m2) -1.09E-01	FRICTION VELOCITY (Meters/sec) 2.973E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI) - (LnZ2-PSI)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.35E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.443E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.46E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.35E 00
Z/L AT GMH -0.013	LAT. HEAT FLUX (Watts/m2) 5.81E 01	SCALING POT. TEMP. (Kelvin) -6.443E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.39E 03
Z/L AT 10 METERS -0.010	SFN. HEAT FLUX (Watts/m2) 2.38E 00	ROUGHNESS LENGTH (Meters) 7.778E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.39E 01
Z/L AT Z1 -0.019	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.24E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.216E-05		N=LNTMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.32E 01			
MONIN-ORUKHOV LENGTH (Meters) -9.773E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1= 0.064959 PSI1 AT Z2= 0.033844 PSI2 AT Z1= 0.039795 PSI2 AT Z2= 0.020538				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
0.4	9.7959	0.74	0.74		

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SH2= +/- .08F-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2274

AIR SPECIFIC HEAT  
(Jtcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(Jtcal./Kg)  
5.9005E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905021630  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.877	8.97	9.98	NO DATA	1012.59	13.672	-0.795	-0.697	0.519	0.617

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.975	14.191	14.289	9.281E-03	82.56	7.560E-03	12.251	14.839	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.036 AT GMH	MOMENTUM FLUX (Nt/m2) -1.21E-01	FRICTION VELOCITY (Meters/sec) 3.137E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.843E-02	AIR DENSITY (Kg/m3) 1.2276
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.01E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.813E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.009E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.045	LAT. HEAT FLUX (Watts/m2) 7.43E 01	SCALING POT. TEMP. (Kelvin) -1.473E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.758E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9003E 05
Z/L AT 10 METERS -0.034	SEN. HEAT FLUX (Watts/m2) 9.63E 00	ROUGHNESS LENGTH (Meters) 9.466E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.648
MONIN-OBUKHOV LENGTH (Meters) -2.906E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.24E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.222E- 3		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.182E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.97E 01			BAR. PRES. AT WT LEVEL (Millibar) 1013.79
	BOWEN RATIO (no units) 0.130			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
205%	205%	126%	174%	174%	6%	55%	348%	63%	111%	111%	83%	126%
202%	202%	46%	44%	130%	6%	17%	173%	23%	67%	153%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021630  
 START TIME: 16:31:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.023 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.18E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.094E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.88E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.299E-05 [3.0E-05]
Z/L AT GMH -0.029 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.11E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.414E-02 [2.0E-02]
Z/L AT 10 METERS -0.022 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.54E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.891E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.462E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.24E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.221E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.53E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.100 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
56%	54%	6%	13%	56%	8%	29%	47%	3%	10%	46%	10%	0%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021700  
START TIME: 17: 2: 0 PST  
END TIME: 17:32:10 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.073	5.097	5.117	4.904	4.764	0.444	4.796
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.994	3.857	2.525	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126624	1421 127657	0.157	101	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) .005V	B(No.) .005V	(No.) .002V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.662	9.86	9.98	NO DATA	308.1	1011.40	-6.19E 01	13.636	285.874
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.766	9.23	10.06	NO DATA	0.15	1012.70			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.842	13.975	14.155	9.274E-03	83.69	7.556E-03	12.233	14.618	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.856	14.087	14.177	9.332E-03	83.59	7.598E-03	12.315	14.733	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021700  
START TIME: 17: 2: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 AT GMH	MOMENTUM FLUX (Nt/m2) -1.81E-01	FRICTION VELOCITY (Meters/sec) 3.844E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]$	GENERAL FORM: $N SLOPE = [(LnZ1-PSI1) - (LnZ2-PSI2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.04E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.447E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 7.06E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.04E 00
Z/L AT GMH -0.014	LAT. HEAT FLUX (Watts/m2) 7.52E 01	SCALING POT. TEMP. (Kelvin) -1.102E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.3HE 03
Z/L AT 10 METERS -0.010	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.19E 01	ROUGHNESS LENGTH (Meters) 1.949E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.52E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -4.90E 01
Z/L AT Z1 -0.019	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.85E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.83E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.010	ROFEN RATIO (no units) 0.070			
MONIN-ORUKHOV LENGTH (Meters) -9.540E 02				
PSI1 AT Z1= 0.066430 PSI1 AT Z2= 0.034639 PSI2 AT Z1= 0.040714 PSI2 AT Z2= 0.021025				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2+ +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2279
AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4164E 02
WATER LAT. HEAT VAP. (Jcal./Kg) 5.9012E 05

RUN NUMBER: 7905021700  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.753	9.30	10.05	NO DATA	1012.60	13.636	-0.883	-0.785	0.437	0.535

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xm-2/3)
10.00	12.851	14.073	14.171	9.326E-03	83.60	7.593E-03	12.305	14.720	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.035 AT GMH	MOMENTUM FLUX (Nt/m2) -1.32E-01	FRICTION VELOCITY (Meters/sec) 3.282E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.077E-01	AIR DENSITY (Kg/m3) 1.2262
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.03E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.525E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.033E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.044	LAT. HEAT FLUX (Watts/m2) 7.49E 01	SCALING POT. TEMP. (Kelvin) -2.657E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.720E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9016E 05
Z/L AT 10 METERS -0.034	SEN. HEAT FLUX (Watts/m2) 1.08E 01	ROUGHNESS LENGTH (Meters) 1.114E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.612
MONIN-OBUKHOV LENGTH (Meters) -2.958E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.19E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.244E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.39E 01			BAR. PRES. AT WT LEVEL (Millibar) 1013.80
	BOWEN RATIO (no units) 0.145			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
143%	143%	100%	157%	116%	6%	83%	273%	50%	108%	66%	70%	100%
194%	194%	46%	44%	122%	6%	24%	166%	23%	67%	145%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021700  
 START TIME: 17: 2: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.021 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.48E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.459E-01 [6.0E 02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.04E-05 [1.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.11E-05 [3.0E 05]
Z/L AT GMH -0.026 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.50E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.598E-02 [2.0E-02]
Z/L AT 10 METERS -0.020 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.98E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.432E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.905E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.19E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.41E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.27E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.116 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER) ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
60%	58%	18%	0%	11%	0%	10%	34%	9%	8%	41%	30%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021730  
START TIME: 17:32:20 PST  
END TIME: 18:23:30 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.110	5.125	4.414	4.260	4.797	0.119	4.871

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.967	3.861	2.524	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125438	1421 126464	0.157	103	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).75V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.544	8.51	10.20	NO DATA	308.9	1011.81	-1.66E 01	13.610	285.755

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)
12.646	8.04	10.23	NO DATA	0.13	1012.91

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Celsius)	(Kelvin)
18.35	12.724	13.876	14.056	9.418E-03	85.59	7.669E-03	12.417	14.507	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Celsius)	(Kelvin)
9.20	12.737	13.982	14.072	9.444E-03	85.19	7.684E-03	12.456	14.621	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021730  
START TIME: 17:32:20 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUNINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.018 AT GHM	MOMENTUM FLUX (Nt/m2) -1.07E-01	FRICTION VELOCITY (Meters/sec) 2.954E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2))] (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI2)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.38E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.557E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.28E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.35E 00
Z/L AT GHM -0.023	LAT. HEAT FLUX (Watts/m2) 5.89E 01	SCALING POT. TEMP. (Kelvin) -1.062E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.24E 03
Z/L AT Z1 -0.032	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.66E 01	ROUGHNESS LENGTH (Meters) 7.591E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.44E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -5.09E 01
Z/L AT Z2 -0.016	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.61E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.44E 05		N=LTEMP. STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -5.738E 02	BOWEN RATIO (no units) 0.066			
PSI1 AT Z1= 0.185311 PSI1 AT Z2= 0.056085 PSI2 AT Z1= 0.065240 PSI2 AT Z2= 0.034269				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) <th>GRAVITATION ACCELERATION (M/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SM1 SM2+ +/- .08F 3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2286

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4166E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9019E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905021730  
 START TIME: 17:32:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.634	8.10	10.22	NO DATA	1012.81	13.610	-0.976	-0.878	0.359	0.457

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.732	13.969	14.067	9.441E-03	85.24	7.682E-03	12.452	14.608	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.060 AT 10M	MOMENTUM FLUX (Nt/m2) -9.38E-02	FRICTION VELOCITY (Meters/sec) 2.762E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.629E-02	AIR DENSITY (Kg/m3) 1.2289
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.50E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.359E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.498E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT 10M -0.072	LAT. HEAT FLUX (Watts/m2) 6.17E 01	SCALING POT. TEMP. (Kelvin) -3.090E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.536E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -0.056	SEN. HEAT FLUX (Watts/m2) 1.06E 01	ROUGHNESS LENGTH (Meters) 5.911E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.588
MONIN-OBUKHOV LENGTH (Meters) -1.801E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.66E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.164E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.58E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.01
	BOWEN RATIO (no units) 0.172			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
160%	160%	116%	167%	128%	9%	124%	295%	58%	109%	71%	78%	116%
187%	187%	46%	45%	115%	9%	34%	160%	23%	68%	138%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021730  
 START TIME: 17:32:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.037 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -9.76E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.817E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.47E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.050E-05 [3.0E-05]
Z/L AT 10M -0.045 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.11E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.749E-02 [2.0E-02]
Z/L AT 10 METERS -0.035 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.44E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.509E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.859E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.66E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.164E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.37E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.115 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
57%	55%	7%	1%	45%	0%	10%	41%	4%	6%	53%	13%	1%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905021800  
START TIME: 18: 2:40 PST  
END TIME: 18:32:50 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.091	5.111	5.309	5.061	4.798	-0.034	5.056

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.936	3.073	2.523	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2EL	W2ELC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123799	1421 124870	0.183	102	-0.009	0.000	0.000	0.992	0.957

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin-2/3)
12.380	10.22	10.88	NO DATA	316.9	1011.82	4.78E 00	13.580	285.593

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.487	9.45	10.14	NO DATA	0.10	1012.91

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.560	13.701	13.881	9.350E-03	85.85	7.609E-03	12.320	14.352	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.577	13.814	13.904	9.395E-03	85.60	7.641E-03	12.386	14.469	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021800  
START TIME: 18: 2:40 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.009 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -2.66E-01	FRICTION VELOCITY (Meters/sec) 4.648E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(L(Z1/Z2)) * (Z1/Z2)]^{1/2}$	GENERAL FORM: $N/SLOPE = [(LN(Z1-PSI) - (LN(Z2-PSI))) / (N1-N2)]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 3.67E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.424E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 8.58E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 8.61E-01
Z/L AT GMH -0.012	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.07E 01	SCALING POT. TEMP. (Kelvin) -1.400E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.41E 03
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 8.09E 00	ROUGHNESS LENGTH (Meters) 3.756E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.94E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 3.86E 01
Z/L AT Z1 -0.017	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 4.78E 00	DRAW COEF. AT 10 METERS (Dimensionless) 0.47E 00		N=LNTEMP STRUC. (K/M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.04E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.101E 03	BOWEN RATIO (no units) 0.089			
PSI1 AT Z1 = 0.058166 PSI1 AT Z2 = 0.030149 PSI2 AT Z1 = 0.035562 PSI2 AT Z2 = 0.010298				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2293

AIR SPECIFIC HEAT  
(J/Kelvin Kg)  
1.014E 02

WATER LAT. HEAT VAP  
(J/Kelvin Kg)  
5.9078E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-03 Kg/Kg.

RUN NUMBER: 7905021800  
 START TIME: 18: 2:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.474	9.54	10.13	NO DATA	1012.82	13.580	-1.106	-1.008	0.221	0.319

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.90	12.572	13.800	13.898	9.390E-03	85.63	7.637E-03	12.378	14.455	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.040 AT GMH	MOMENTUM FLUX (Nt/m2) -1.41E-01	FRICTION VELOCITY (Meters/sec) 3.386E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.147E-01	AIR DENSITY (Kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.98E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.158E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.980E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E-02
Z/L AT GMH -0.050	LAT. HEAT FLUX (Watts/m2) 7.36E-01	SCALING POT. TEMP. (Kelvin) -3.202E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.084E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9026E-05
Z/L AT 10 METERS -0.038	SEN. HEAT FLUX (Watts/m2) 1.35E-01	ROUGHNESS LENGTH (Meters) 1.245E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.558
MONIN-OBUKHOV LENGTH (Meters) -2.610E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.78E-00	DRAG COEF. AT 10 METERS (Dimensionless) 1.260E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.19E-01			HAR. PRES. AT WT LEVEL (Millibar) 1014.02
	BOWEN RATIO (no units) 0.183			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
117%	117%	84%	148%	94%	20%	130%	242%	42%	106%	52%	62%	84%
180%	180%	46%	45%	108%	20%	39%	153%	23%	68%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021800  
 START TIME: 18: 2:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.021 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.85E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.833E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.14E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.872E-05 (3.0E-05)
Z/L AT GMH -0.027 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.76E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.914E-02 (2.0E-02)
Z/L AT 10 METERS -0.021 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.06E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.274E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.845E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.78E-00 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.650E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.46E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.147 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
7%	72%	35%	12%	25%	0%	7%	33%	17%	5%	49%	56%	5%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905021830  
START TIME: 18:33: 0 PST  
END TIME: 19: 3:10 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.076	5.045	4.961	4.742	4.819	-0.085	5.076
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.916	3.805	2.525	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND HEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122513	1421 123633	0.183	104	-0.009	0.000	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.251	9.55	9.99	NO DATA	317.6	1012.14	1.19E 01	15.561	285.467
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.363	8.86	10.05	NO DATA	0.07	1013.24			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.431	13.564	13.744	9.302E-03	86.07	7.564E-03	12.252	14.236	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.453	13.681	13.772	9.344E-03	85.76	7.592E-03	12.312	14.356	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021830  
START TIME: 18:33: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (=Stable, =Unstable) -0.014 AT GMH	MOMENTUM FLUX (Nt/m2) -2.22E-01	FRICTION VELOCITY (Meters/sec) 4.246E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/((N1+Z1)^2 + Z1^2)]^{1/2}$	GENERAL FORM: $N$ SLOPE $[(N1-N2)/((N1+Z1)^2 + Z1^2)]^{1/2}$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.40E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.510E-05	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis DWS/DZ = 7.67E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PSI=PSI1 WS SLOPE = 9.42E-01
Z/L AT GMH -0.019	LAT. HEAT FLUX (Watts/m2) 8.40E 01	SCALING POT. TEMP. (Kelvin) -1.819E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE = -8.30E 03
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m2) 9.61E 00	ROUGHNESS LENGTH (Meters) 2.754E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.49E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PSI=PSI2 PTK SLOPE = 2.92E 01
Z/L AT Z1 -0.026	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.19E 01	DRAW COEFF. AT 10 METERS (Dimensionless) -0.47E 03		
Z/L AT Z2 -0.013	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.06E 02			
MONIN-OBUKHOV LENGTH (Meters) -6.970E 02	BOWEN RATIO (no unit) 0.114			
PSI1 AT Z1 = 0.088493 PSI1 AT Z2 = 0.046707 PSI2 AT Z1 = 0.054575 PSI2 AT Z2 = 0.028457				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1 SH2 = +/- 0.01E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2303

AIR SPECIFIC HEAT  
(J/cal./Kg. Kel.)  
2.4164E 02

WATER LAT. HEAT VAP  
(J/cal./Kg)  
5.9035E 05

RUN NUMBER: 7705021H30  
 START TIME: 18:33:00 PST  
 START DATE: 2 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 31 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meters/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
12.350	8.95	10.04	NO DATA	1013.14	13.561	-1.211	-1.113	0.106	0.204
MOIST. (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.448	13.667	13.765	9.339E-03	85.80	7.589E-03	12.305	14.342	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.054 AT GMM	MOMENTUM FLUX (Nt/m2) 1.20E-01	FRICTION VELOCITY (Meters/sec) 3.125E-01	WITH LONG VELOCITY (Meter2/sec2) -9.767E-02	AIR DENSITY (Kg/m3) 1.2306
GEOMETRIC MEAN HEIGHT (Meter) GMM: (Z1+Z2)/2 12.92	HUMIDITY FLUX (Kg/sec m2) 2.84E-05	SCALING SPEC. HUMID. (Kg/Kg) 7.394E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.844E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel) 2.4164E-02
Z/L AT GMM -0.065	LAT. HEAT FLUX (Watts/m2) 7.03E-01	SCALING POT. TEMP. (Kelvin) -5.571E-02	WITH POT. TEMPERATURE (Meter Kel /sec) 1.116E-02	WATER LAT. HEAT VAP (J/cal./Kg) 5.9033E-05
Z/L AT 10 METERS -0.050	SEN. HEAT FLUX (Watts/m2) 1.39E-01	ROUGHNESS LENGTH (Meters) 9.333E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.544
MONIN-OBUKHOV LENGTH (Meters) -1.993E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.19E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.220E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.60E-01			BAR. PRES. AT WT LEVEL (Millibar) 1014.34
	BOWEN RATIO (no units) 0.198			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE +ve/-ve:

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH LENGTH	DRAW COEF
111%	111%	87%	150%	85%	11%	119%	235%	43%	106%	42%	63%	87%
175%	175%	46%	45%	103%	11%	36%	148%	23%	68%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7705021H30  
 START TIME: 18:33:00 PST  
 START DATE: 2 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 31 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.030 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) 1.55E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.513E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM: (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.97E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.050E-05 (3.0E-05)
Z/L AT GMM -0.037 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.34E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.256E-02 (2.0E-02)
Z/L AT 10 METERS -0.028 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.16E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.668E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 3.542E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.19E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.351E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.02E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.166 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE +ve/-ve:

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH LENGTH	DRAW COEF
68%	65%	34%	11%	19%	0%	5%	26%	17%	6%	43%	56%	6%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021900  
START TIME: 19: 3:20 PST  
END TIME: 19:33:30 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.067	5.087	4.907	4.709	4.827	-0.091	5.070

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.895	3.798	2.526	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTFICAL	WSIEC	WSIEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121579	1421 122789	0.183	106	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.158	9.45	9.94	NO DATA	318.1	1012.27	1.27E 01	13.539	285.374

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.271	8.80	10.00	NO DATA	0.05	1013.36

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.338	13.465	13.645	9.274E-03	86.30	7.537E-03	12.211	14.150	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.361	13.584	13.674	9.318E-03	86.00	7.568E-03	12.274	14.271	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905021900  
START TIME: 19: 3:20 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.017 AT GMH	MOMENTUM FLUX (Nt/m2) -1.99E-01	FRICTION VELOCITY (Meters/sec) 4.020E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/Ln(Z1/Z2)* (Z1+Z2)/21	GENERAL FORM: N/SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.24E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.550E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 7.20E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 9.95E-01
Z/L AT GMH -0.022	LAT. HEAT FLUX (Watts/m2) 8.01E 01	SCALING POT. TEMP. (Kelvin) -1.910E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.25E 03
Z/L AT 10 METERS -0.017	SEN. HEAT FLUX (Watts/m2) 9.56E 00	ROUGHNESS LENGTH (Meters) 2.278E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.60E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.83E 01
Z/L AT Z2 -0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 2.2011 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-ORUKMOV LENGTH (Meters) -5.999E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.02E 02			
PSI1 AT Z1= 0.102596 PSI1 AT Z2= 0.054561 PSI2 AT Z1= 0.063512 PSI2 AT Z2= 0.033322	BOWEN RATIO (no units) 0.119			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFH HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 9H2= +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2309

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9041E 05

RUN NUMBER: 7905021900  
 START TIME: 19 3:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.257	8.88	9.99	NO DATA	1011.27	13.539	-1.282	-1.184	0.030	0.128

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.355	13.570	13.668	9.313E-03	86.04	7.564E-03	12.267	14.257	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED WEAKEST VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.058 AT GMH	MOMENTUM FLUX (Nt/m2) -1.18E-01	FRICTION VELOCITY (Meters/sec) 3.097E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.591E-02	AIR DENSITY (Kg/m3) 1.2311
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.84E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.441E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.837E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.070	LAT. HEAT FLUX (Watts/m2) 7.01E 01	SCALING POT. TEMP. (Kelvin) -3.770E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.168E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9038E 05
Z/L AT 10 METERS -0.054	SFN. HEAT FLUX (Watts/m2) 1.45E 01	ROUGHNESS LENGTH (Meters) 9.030E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.524
MONIN-OBUKHOV LENGTH (Meters) -1.653E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.216E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.74E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.47
	BOWEN RATIO (no units) 0.207			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
113%	113%	92%	152%	86%	11%	119%	239%	46%	106%	41%	66%	92%
172%	172%	46%	45%	100%	11%	35%	145%	23%	68%	123%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905021900  
 START TIME: 19 3:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.033 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.45E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.405E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.93E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.695E-05 [3.0E-05]
Z/L AT GMH -0.041 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.24E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.371E-02 [2.0E-02]
Z/L AT 10 METERS -0.032 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.19E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.446E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.16E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.51E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.85E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.174 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
63%	60%	29%	8%	21%	0%	3%	26%	14%	6%	44%	49%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905021930  
START TIME: 19:33:40 PST  
END TIME: 20:35:50 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.205	0.000	0.001	5.055	5.077	4.943	4.733	4.851	-0.091	4.933
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
5.968	3.794	2.528	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WT1FCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120909	1421 122101	0.183	107	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).25V	(No.).31Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
17.091	9.52	9.87	NO DATA	312.7	1012.63	1.27E 01	13.513	285.310
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.210	8.85	9.94	NO DATA	0.04	1013.73			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.271	13.392	13.571	9.234E-03	86.26	7.500E-03	12.156	14.093	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.00	12.300	13.518	13.608	9.284E-03	85.99	7.536E-03	12.227	14.219	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905021930  
START TIME: 19:33:40 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
UNAD RICHARDSON NUMBER (+ Stable, - Unstable) R = 0.20 AT GMH	MOMENTUM FLUX (Nt/m2) -2.19E-01	FRICTION VELOCITY (Meters/sec) 4.216E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2))* (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(Ln(Z1-PSI))-(Ln(Z2-PSI))]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 3.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.593E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.47E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 9.49E-01
Z/L AT GMH 0.026	LAT. HEAT FLUX (Watts/m2) 8.46E 01	SCALING POT. TEMP. (Kelvin) -2.438E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.20E 03
Z/L AT 10 METERS -0.028	SFN. HEAT FLUX (Watts/m2) 1.28E 01	ROUGHNESS LENGTH (Meters) 2.686E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.30E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.22E 01
Z/L AT Z1 -0.056	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 0.062E-05		N=LnTEMP. STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.018	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.10E 02			
MINIM. ORIKHOV LENGTH (Meters) -5.050E 02	ROMEN RATIO (no units) 0.151			
PSI1 AT Z1 = 0.117831 PSI1 AT Z2 = 0.063164 PSI2 AT Z1 = 0.073231 PSI2 AT Z2 = 0.038675				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) <th>GRAVITATION (M/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SFN HEAT TRANSF. COEF. <th>BULK MOISTURE TRANSF. COEF. </th></th></th></th></th>	GRAVITATION (M/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SFN HEAT TRANSF. COEF. <th>BULK MOISTURE TRANSF. COEF. </th></th></th></th>	PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SFN HEAT TRANSF. COEF. <th>BULK MOISTURE TRANSF. COEF. </th></th></th>	PROFILE TUR. SCHMIDT NUMBER <th>BULK SFN HEAT TRANSF. COEF. <th>BULK MOISTURE TRANSF. COEF. </th></th>	BULK SFN HEAT TRANSF. COEF. <th>BULK MOISTURE TRANSF. COEF. </th>	BULK MOISTURE TRANSF. COEF.
0.4	9.7999	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = -0.08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2316

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4162E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9044E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905021930  
 START TIME: 19:33:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
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PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.196	8.93	9.93	NO DATA	1013.63	13.513	-1.318	-1.220	-0.011	0.087

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.294	13.502	13.600	9.270E-03	86.02	7.532E-03	12.219	14.204	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.059 AT GHM	MOMENTUM FLUX (Nt/m2) -1.20E-01	FRICTION VELOCITY (Meters/sec) 3.117E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.717E-02	AIR DENSITY (Kg/m3) 1.2319
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.88E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.487E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.875E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GHM -0.071	LAT. HEAT FLUX (Watts/m2) 7.11E 01	SCALING POT. TEMP. (Kelvin) -3.855E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.202E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9042E 05
Z/L AT 10 METERS -0.054	SEN. HEAT FLUX (Watts/m2) 1.50E 01	ROUGHNESS LENGTH (Meters) 9.247E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.503
MONIN-ORUKHOV LENGTH (Meters) -1.836E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.219E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.87E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.83
	BOWEN RATIO (no units) 0.211			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
104%	104%	88%	150%	77%	11%	116%	227%	44%	106%	33%	64%	88%
171%	171%	46%	44%	99%	11%	35%	143%	23%	67%	122%	43%	40%

\* CONTINUED BELOW

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 START TIME: 19:33:40 PST  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.035 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -1.54E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.493E-01 [6.0E-02]
GEOMETRIC MEAN Ht (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.00E-05 [8.0E-05]	SCALING SPEC. HUMID. (Kg/Kg) -7.139E-05 [3.0E-05]
Z/L AT GHM -0.043 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.42E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.739E-02 [2.0E-02]
Z/L AT 10 METERS -0.033 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.38E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.631E-04 [6.0E-05]
MONIN-ORUKHOV LENGTH (Meters) -3.040E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.551E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.188 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
57%	54%	34%	10%	8%	8%	6%	16%	16%	6%	30%	55%	34%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905022030  
START TIME: 20:30: 0 PST  
END TIME: 20:59:50 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.042	5.064	5.075	4.854	4.888	-0.091	5.254
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT REF.B		
3.837	3.863	2.527	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND (AND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH)Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120615	1421 121765	0.199	77	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.062	9.77	9.79	NO DATA	323.6	1013.20	1.27E 01	13.484	285.279
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.176	9.04	9.86	NO DATA	0.03	1014.29			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.241	13.356	13.535	9.193E-03	85.99	7.462E-03	12.101	14.073	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.267	13.477	13.567	9.244E-03	85.74	7.498E-03	12.172	14.196	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905022030  
START TIME: 20:30: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973)

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.015 AT GMH	MOMENTUM FLUX (Nt/m2) -2.49E-01	FRICTION VELOCITY (Meters/sec) 4.496E-01	GENERAL FORM: DN/DZ = (N1-N2)/(Ln(Z1/Z2))	GENERAL FORM: (N' SLOPE = (LnZ1-PS1)-(LnZ2-PS1))/( [N1-N2])
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.61E-05	SCALING SPEC HUMID (Kg/Kg) 6.512E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 8.12E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 8.90E-01
Z/L AT GMH -0.019	LAT. HEAT FLUX (Watts/m2) 8.94E 01	SCALING POT. TEMP. (Kelvin) -2.060E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.30E 03
Z/L AT 10 METERS -0.015	SEN HEAT FLUX (Watts/m2) 1.15E 01	ROUGHNESS LENGTH (Meters) 3.354E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.82E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -2.62E 01
Z/L AT Z1 -0.027	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 2.59E-05		N=LnTEMP.STRUC. (K/m 2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.013	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.13E 02			
MONIN-OBUKHOV LENGTH (Meters) -6.893E 02	ROWEN RATIO (no units) 0.129			
PS11 AT Z1= 0.089383 PS11 AT Z2= 0.047200 PS12 AT Z1= 0.055137 PS12 AT Z2= 0.028762				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2325

AIR SPECIFIC HEAT  
(J/Kg K)  
2.41E+02

WATER LAT. HEAT VAP.  
(J/Kg)  
5.9846E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

RUN NUMBER: 7905022030  
 START TIME: 20:30: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V.POT-WT TEMP. (Kelvin)
12.163	9.13	9.85	NO DATA	1014.20	13.484	-1.321	-1.223	-0.021	0.077

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.261	13.463	13.561	9.238E-03	85.77	7.494E-03	12.164	14.181	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.055 AT 10M	MOMENTUM FLUX (Nt/m2) -1.27E-01	FRICTION VELOCITY (Meters/sec) 3.205E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.027E-01	AIR DENSITY (Kg/m3) 1.2327
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.97E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.520E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.971E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT 10M -0.067	LAT. HEAT FLUX (Watts/m2) 7.34E 01	SCALING POT. TEMP. (Kelvin) -3.829E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.227E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9044E 05
Z/L AT 10 METERS -0.051	SFN. HEAT FLUX (Watts/m2) 1.53E 01	ROUGHNESS LENGTH (Meters) 1.022E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.482
MONIN-OBUKHOV LENGTH (Meters) -1.953E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.232E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E 02			BAR. PRES. AT WT LEVEL (Millibar) 1015.40
	BOWEN RATIO (no units) 0.208			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. ND. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
104%	104%	84%	148%	79%	11%	116%	227%	42%	106%	37%	62%	84%
171%	171%	46%	44%	99%	11%	35%	143%	23%	67%	122%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905022030  
 START TIME: 20:30: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.030 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.70E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.663E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.12E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.12E-05 [3.0F-05]
Z/L AT 10M -0.037 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.71E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.475E-02 [2.0E-02]
Z/L AT 10 METERS -0.028 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.32E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.979E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.523E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.061E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.04F 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.178 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. ND. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
70%	67%	38%	12%	14%	0%	7%	21%	18%	7%	40%	60%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905022100  
START TIME: 21: 0: 0 PST  
END TIME: 21:30:10 PST  
START DATE: 2 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT.1	TEMP. STRUCT.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.052	5.073	4.511	4.316	4.897	-0.091	5.176
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.82H	3.860	2.524	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120.002	1421 121372	0.199	76	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA NAME	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. ) .005V	B(No. ) .005V	(No. ) .002V	(No. ) 5V	(No. ) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP. STRUCT.1	WIND DIR.	BAR. PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.020	8.69	9.85	NO DATA	321.0	1013.33	1.27E 01	13.474	285.239
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP. STRUCT.2	TIDE TABLE	BAR. PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.137	8.66	9.91	NO DATA	0.05	1014.43			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.200	13.319	13.499	9.232E-03	86.55	7.491E-03	12.150	14.037	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.227	13.442	13.532	9.277E-03	86.25	7.523E-03	12.214	14.161	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905022100  
START TIME: 21: 0: 0 PST  
START DATE: 2 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.021 AT GMM	MOMENTUM FLUX (Nt/m2) -1.96E-01	FRICTION VELOCITY (Meters/sec) 3.988E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1+Z2)/2	GENERAL FORM: N SLOPE = 1/(LnZ1-PSI1)-(LnZ2-PSI2))/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.75E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.603E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.05E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.00E 00
Z/L AT GMM -0.027	LAT. HEAT FLUX (Watts/m2) 8.03E 01	SCALING POT. TEMP. (Kelvin) -2.249E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.19E 03
Z/L AT 10 METERS -0.020	S-FN. HEAT FLUX (Watts/m2) 1.12E 01	ROUGHNESS LENGTH (Meters) 2.217E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.04E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.40E 01
Z/L AT Z2 -0.019	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 0.0001-03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
ADONIN-BRUKHOV LENGTH (Meters) -4.892E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.04E 02			
PSI1 AT Z1 = 0.121154 PSI1 AT Z2 = 0.065017 PSI2 AT Z1 = 0.075360 PSI2 AT Z2 = 0.091556	BOWEN RATIO (no units) 0.139			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2328

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.416E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9848E 05

RUN NUMBER: 7905022100  
 START TIME: 21: 0: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
12.123	8.13	9.90	NO DATA	1014.34	13.474	-1.351	-1.253	-0.047	0.051

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.221	13.427	13.525	9.271E-03	86.29	7.519E-03	12.207	14.147	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.080 AT 6M	MOMENTUM FLUX (Nt/m2) -9.51E-02	FRICTION VELOCITY (Meters/sec) 2.778E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.717E-02	AIR DENSITY (Kg/m3) 1.2330
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.61E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.606E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.605E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT 6M -0.095	LAT. HEAT FLUX (Watts/m2) 6.44E 01	SCALING POT. TEMP. (Kelvin) -4.096E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.138E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9046E 05
Z/L AT 10 METERS -0.073	SEN. HEAT FLUX (Watts/m2) 1.42E 01	ROUGHNESS LENGTH (Meters) 6.039E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.475
MONIN-OBUKHOV LENGTH (Meters) -1.372E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.167E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.13E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.54
	BOWEN RATIO (no units) 0.220			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
103%	103%	86%	149%	78%	11%	115%	227%	43%	106%	35%	63%	86%
170%	170%	46%	44%	98%	11%	35%	142%	23%	67%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905022100  
 START TIME: 21: 0: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.043 [0.02] AT 6M	MOMENTUM FLUX (Nt/m2) -1.30E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.200E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.75E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.215E-05 [3.0E-05]
Z/L AT 6M -0.052 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.81E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.666E-02 [2.0E-02]
Z/L AT 10 METERS -0.040 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.25E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.259E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.481E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.167E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.43E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.189 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
70%	67%	40%	13%	12%	0%	8%	22%	20%	7%	40%	65%	4%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905022130  
START TIME: 21:30:20 PST  
END TIME: 22:03:30 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.045	5.664	4.592	4.439	4.893	-0.091	5.160

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. T. REF. B
3.816	3.784	2.522	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W1SEC	W2SEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 119318	1421 120522	0.199	75	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >SV)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.28

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	PLAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.932	8.84	9.81	NO DATA	320.5	1013.28	1.27E 01	13.463	285.152

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.052	8.28	9.86	NO DATA	0.07	1014.38

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.112	13.227	13.406	9.208E-03	86.82	7.470E-03	12.115	13.955	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.142	13.352	13.442	9.247E-03	86.44	7.497E-03	12.171	14.041	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905022130  
START TIME: 21:30:20 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.030 AT 6M	MOMENTUM FLUX (Nt/m2) -1.64E-01	FRICTION VELOCITY (Meters/sec) 3.649E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(\ln(Z1/Z2))] * [(Z1+Z2)/2]$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.02E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.720E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.28E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.10E 00
Z/L AT 6M -0.037	LAT. HEAT FLUX (Watts/m2) 7.44E 01	SCALING POT. TEMP. (Kelvin) -2.589E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.04E 03
Z/L AT 10 METERS -0.029	SEN. HEAT FLUX (Watts/m2) 1.18E 01	ROUGHNESS LENGTH (Meters) 1.623E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.44E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.0YE 01
Z/L AT Z1 -0.053	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 2.049E-04		N=LnTEMP. STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.026	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.93E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.485E 02	ROMEN RATIO (no units) 0.158			
PSI1 AT Z1= 0.161862 PSI1 AT Z2= 0.088697 PSI2 AT Z1= 0.101658 PSI2 AT Z2= 0.054704				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	1.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

\* GENERAL NOTES:  
Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

AIR DENSITY  
(Kg/m3)  
1.2331

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.416E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9053E 05

RUN NUMBER: 7905022130  
 START TIME: 21:30:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

■ ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.038	8.35	9.85	NO DATA	1014.28	13.463	-1.426	1.328	-0.126	-0.028

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.136	13.337	13.435	9.243E-03	86.18	7.494E-03	12.165	14.066	NO DATA

■ BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.078 AT GMH	MOMENTUM FLUX (Nt/m2) -1.02E-01	FRICTION VELOCITY (Meters/sec) 2.869E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.232E-02	AIR DENSITY (Kg/m3) 1.2334
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.621E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.697E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4162E-02
Z/L AT GMH -0.092	LAT. HEAT FLUX (Watts/m2) 6.67E-01	SCALING POT. TEMP. (Kelvin) -4.251E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.220E-02	WATER LAT. HEAT VAP (J/cal./Kg) 5.9051E-05
Z/L AT 10 METERS -0.071	SEN. HEAT FLUX (Watts/m2) 1.52E-01	ROUGHNESS LENGTH (Meters) 6.817E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.463
MONIN-OBUKHOV LENGTH (Meters) -1.409E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.12E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.181E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.46E-01			BAR. PRES. AT WT LEVEL (Millibar) 1015.48
	BOWEN RATIO (no units) 0.228			

■ MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
111%	111%	98%	156%	82%	10%	118%	237%	49%	107%	33%	69%	98%
168%	168%	46%	44%	96%	10%	35%	140%	23%	67%	119%	43%	40%

■ CONTINUED BELOW

RUN NUMBER: 7905022130  
 START TIME: 21:30:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

■ COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.049 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.21E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.118E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.272E-05 (3.0E-05)
Z/L AT GMH -0.059 (0.02)	LAT. HEAT FLUX (Watts/m2) 6.85E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.947E-02 (2.0E-02)
Z/L AT 10 METERS -0.046 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.34E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.043E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -2.196E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.44E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.57E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.282 (0.08)	

■ DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
50%	47%	27%	7%	13%	0%	3%	18%	13%	6%	32%	46%	44%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 705000200  
START TIME: 07:00 PST  
END TIME: 07:40 PST  
START DATE: 02 May 1979 (DAY 120)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERICALITY: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* CHANNEL CHANNEL RAW DATA (AVERAGE MODE):

No. 01 WIND DIR. 1	No. 02 WIND DIR. 2	No. 03 WIND DIR. 3	No. 04 WIND DIR. 4	No. 05 WIND DIR. 5	No. 06 WIND DIR. 6	No. 07 WIND DIR. 7	No. 08 WIND DIR. 8	No. 09 WIND DIR. 9
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. 10 WIND DIR. 10	No. 11 WIND DIR. 11	No. 12 WIND DIR. 12	No. 13 WIND DIR. 13	No. 14 WIND DIR. 14	No. 15 WIND DIR. 15	No. 16 WIND DIR. 16	No. 17 WIND DIR. 17	No. 18 WIND DIR. 18
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* ESCARPMENT CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 WIND DIR. 1	No. 2 WIND DIR. 2	UPWIND NEAR HEIGHT/LENGTH PATH (Meters)	UPWIND LAND HEIGHT/LENGTH PATH (Meters)	DP1FCAL (Volts)	DP2FCAL (Volts)	WTF1CAL (Volts)	WTF2CAL (Volts)	WS1CAL (Coeff.)	WS2CAL (Coeff.)
0.000	0.000	0.103	102	-0.009	0.000	0.000	0.000	0.992	0.952

## \* CHANNEL ESCARPMENT PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

DATA BASE (No. scans)	DATA BASE (No. scans)	DATA BASE (No. scans)	VOLT. REF. DEV. VOLT. REF. DEV. A (No.) 0.050V B (No.) 0.050V	ZERO REF. DEV. VOLT. REF. DEV. (No.) 0.020V	AC. VOLT. FLUX AC. FREQ. FLUX (No.) 15V (No.) 1Hz	AC. VOLT. FLUX AC. FREQ. FLUX (No.) 15V (No.) 1Hz	AC. VOLT. FLUX AC. FREQ. FLUX (No.) 15V (No.) 1Hz	AC. VOLT. FLUX AC. FREQ. FLUX (No.) 15V (No.) 1Hz
1	1	1	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE TABLE AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND DIR. 1 (Degrees)	WIND DIR. 2 (Degrees)	WIND DIR. 3 (Degrees)	WIND DIR. 4 (Degrees)	WIND DIR. 5 (Degrees)	WIND DIR. 6 (Degrees)	WIND DIR. 7 (Degrees)	WIND DIR. 8 (Degrees)	WIND DIR. 9 (Degrees)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND DIR. 10 (Degrees)	WIND DIR. 11 (Degrees)	WIND DIR. 12 (Degrees)	WIND DIR. 13 (Degrees)	WIND DIR. 14 (Degrees)	WIND DIR. 15 (Degrees)	WIND DIR. 16 (Degrees)	WIND DIR. 17 (Degrees)	WIND DIR. 18 (Degrees)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT 1 (Meters)	POT. TEMP. 1 (Celsius)	VIR. TEMP. 1 (Celsius)	V. POT. TEMP. 1 (Celsius)	ABS. HUMID. 1 (Kg/m3)	REL. HUMID. 1 (Percent)	SPEC. HUMID. 1 (Kg/Kg)	VAP. PRES. 1 (Millibar)	S. VAP. PRES. 1 (Millibar)	REF. INDEX 1 (Kelvin-2/3)
13.35	12.100	13.221	13.401	9.249E-03	87.28	7.504E-03	12.109	13.943	NO DATA
HEIGHT 2 (Meters)	POT. TEMP. 2 (Celsius)	VIR. TEMP. 2 (Celsius)	V. POT. TEMP. 2 (Celsius)	ABS. HUMID. 2 (Kg/m3)	REL. HUMID. 2 (Percent)	SPEC. HUMID. 2 (Kg/Kg)	VAP. PRES. 2 (Millibar)	S. VAP. PRES. 2 (Millibar)	REF. INDEX 2 (Kelvin-2/3)
9.20	12.141	13.346	13.436	9.284E-03	86.85	7.527E-03	12.219	14.069	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 705000200  
START TIME: 07:40 PST  
START DATE: 02 May 1979 (DAY 120)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERICALITY: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRASS-RICHARDSON NUMBER (+Stable, -Unstable) -0.033 AT 6M	MOMENTUM FLUX (N/m2) -1.49E-01	FRICTION VELOCITY (Meters/sec) 3.471E-01	GENERAL FORM: $DH/DZ = (1/N1 - N2)/(1/N1 + 1/N2)$	GENERAL FORM: $N1 SLOPE = (1/N1 - N2)/(1/N1 + 1/N2)$
FORMULARIO MEAN HEIGHT (Meters) GRH: $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.897E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.764E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.91E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 1.14E-06
Z/L AT 6M 0.041	LAT. HEAT FLUX (Watts/m2) 7.15E-01	SCALING POT. TEMP. (Kelvin) -2.588E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = -2.99E-03
Z/L AT 10 METERS -0.030	SFN. HEAT FLUX (Watts/m2) 1.12E-01	ROUGHNESS LENGTH (Meters) 1.360E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.41E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = 2.09E-01
Z/L AT Z1 0.047	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.03H-03		
Z/L AT Z2 0.029	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.55E-01			
MONIN OBUKHOV LENGTH (Meters) -3.131E-02	HUMEN RATIO (no units) 0.157			
PS11 AT Z1 = 0.176925 PS11 AT Z2 = 0.097753 PS12 AT Z1 = 0.111488 PS12 AT Z2 = 0.060372				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec2)	PROFILE TUN. PRANDTL NUMBER	PROF. F. TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2331

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.0015 Kg/Kg.

AIR SPECIFIC HEAT (J/Kelvin-Kg)
2.416E-02

WATER LAT. HEAT VAP. (J/Kelvin-Kg)
5.9054E-05



RUN NUMBER: 790502200  
 START TIME: 22:00:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.026	8.51	9.91	NO DATA	1014.20	13.451	-1.425	-1.327	-0.120	-0.022
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.104	13.331	13.429	9.280E-03	86.90	7.524E-03	12.214	14.054	NO DATA

BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.073 AT 10M	MOMENTUM FLUX (Nt/m2) -1.06E-01	FRICTION VELOCITY (Meters/sec) 2.937E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.626E-02	AIR DENSITY (Kg/m3) 1.2333
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.441E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.695E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT 10M -0.087	LAT. HEAT FLUX (Watts/m2) 6.66E 01	SCALING POT. TEMP. (Kelvin) -4.218E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.239E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9051E 05
Z/L AT 10 METERS -0.067	SEN. HEAT FLUX (Watts/m2) 1.55E 01	ROUGHNESS LENGTH (Meters) 7.434E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.449
MONIN-OBUKHOV LENGTH (Meters) -1.488E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.192E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.168E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.48E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.40
	BOWEN RATIO (no units) 0.232			

MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
118%	118%	106%	160%	86%	11%	121%	247%	53%	107%	33%	73%	106%
168%	168%	46%	45%	96%	11%	35%	140%	23%	68%	119%	43%	40%

CONTINUED BELOW

RUN NUMBER: 790502200  
 START TIME: 22:00:40 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.050 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.19E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.098E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.74E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.179E-05 [3.0E-05]
Z/L AT 10M -0.060 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.77E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.945E-02 [2.0E-02]
Z/L AT 10 METERS -0.047 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.32E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 9.717E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.150E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.368E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.49E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.205 [0.08]	

DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
41%	38%	19%	4%	16%	0%	0%	19%	9%	5%	32%	33%	20%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905022230  
START TIME: 22:31: 0 PST  
END TIME: 23: 1:10 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.001	No.04 DEW POINT2 5.099	No.05 WIND SPEED1 4.751	No.06 WIND SPEED2 4.608	No.07 BAR.PRES.2 4.884	No.08 SKY RAD. -0.091	No.09 WIND DIR. 4.959
No.10 BULK WT TEMP 3.795	No.11 AC FREQUENCY 3.807	No.12 AC VOLTAGE 2.521	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 119470	No.2 AIR TEMP.2 1421 120697	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 99	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTRFCAL (Volts) 0.000	WS1FCAL (Coeff.) 0.997	WS2FCAL (Coeff.) 0.954
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT.REF.DEV (No. scans) 0	VOLT.REF.DEV (No. scans) 0	ZERO REF.DEV (No. scans) 0	AC VOLT.FLUX (No. scans) 0	AC FREQ.FLUX (No. scans) 0	AC VOLTAGE (No. scans) 11.5	AC FREQUENCY (Hz) 59.81
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 11.947	WIND SPEED1 (Meter/sec) 9.15	DEW POINT1 (Celsius) 10.02	TEMP.STRUC.1 (Kelvin-M/2/3) NO DATA	WIND DIR. (Deg.True) 313.6	BAR.PRES.1 (Millibar) 1013.14	SKY RAD. (Watt/m2) 1.27E 01	BULK WT TEMP (Celsius) 13.443	MEAN AIR TEMP (Kelvin) 285.168
AIR TEMP.2 (Celsius) 12.070	WIND SPEED2 (Meter/sec) 8.62	DEW POINT2 (Celsius) 10.07	TEMP.STRUC.2 (Kelvin-M/2/3) NO DATA	TIDE TABLE (Meter MSL) 0.14	BAR.PRES.2 (Millibar) 1014.23			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.127	VIR.TEMP.1 (Celsius) 13.261	V.POT.TEMP.1 (Celsius) 13.440	ABS.HUMID.1 (Kg/M3) 9.339E-03	REL.HUMID.1 (Percent) 87.98	SPEC.HUMID.1 (Kg/Kg) 7.578E-03	VAP.PRES.1 (Millibar) 12.288	S.VAP.PRES.1 (Millibar) 13.967	REF.INDEX 1 (Kelvin-M/2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.160	VIR.TEMP.2 (Celsius) 13.388	V.POT.TEMP.2 (Celsius) 13.478	ABS.HUMID.2 (Kg/M3) 9.375E-03	REL.HUMID.2 (Percent) 87.55	SPEC.HUMID.2 (Kg/Kg) 7.603E-03	VAP.PRES.2 (Millibar) 12.340	S.VAP.PRES.2 (Millibar) 14.096	REF.INDEX 2 (Kelvin-M/2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905022230  
START TIME: 22:31: 0 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.036 AT GHM	MOMENTUM FLUX (Nt/m2) -1.52E-01	FRICTION VELOCITY (Meters/sec) 3.510E-01	GENERAL FORM: DN/DZ = [(N1-N2)/1/Ln(Z1/Z2)]*	GENERAL FORM: N SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.94E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.792E-05	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis DSH/DZ = 5.94E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.14E 00
Z/L AT GHM -0.044	LAT. HEAT FLUX (Watts/m2) 7.27E 01	SCALING POT. TEMP. (Kelvin) -2.811E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.96E 03
Z/L AT 10 METERS -0.034	SEN. HEAT FLUX (Watts/m2) 1.23E 01	ROUGHNESS LENGTH (Meters) 1.415E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -3.69E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -1.92E 01
Z/L AT Z1 -0.065	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.801E-05		N-LnTEMP.STRUC. (KxM-2/3) Z-HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.031	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.77E 01			
MONIN-ORUKHOV LENGTH (Meters) -2.934E 02	ROMEN RATIO (no units) 0.169			
PS11 AT Z1 = 0.186630 PS11 AT Z2 = 0.103477 PS12 AT Z1 = 0.117846 PS12 AT Z2 = 0.064073				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2328

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.08 K/Kg.

AIR SPECIFIC HEAT  
(J/Kg K)  
2.4164E 02

WATER LAT. HEAT VAP.  
(J/Kg K)  
5.9052E 05

RUN NUMBER: 7905022230  
 START TIME: 22:31: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.055	8.68	10.06	NO DATA	1014.14	13.443	-1.388	-1.290	-0.070	0.028

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.153	13.373	13.471	9.371E-03	87.60	7.600E-03	12.335	14.080	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.067 AT GMM	MOMENTUM FLUX (Nt/m2) -1.12E-01	FRICTION VELOCITY (Meters/sec) 3.011E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.066E-02	AIR DENSITY (Kg/m3) 1.2330
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.64E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.106E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.638E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMM -0.080	LAT. HEAT FLUX (Watts/m2) 6.52E 01	SCALING POT. TEMP. (Kelvin) -4.086E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.236E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9050E 05
Z/L AT 10 METERS -0.062	SEN. HEAT FLUX (Watts/m2) 1.53E 01	ROUGHNESS LENGTH (Meters) 8.147E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.440
MONIN-OBUKHOV LENGTH (Meters) -1.615E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.203E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.33E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.34
	BOWEN RATIO (no units) 0.235			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTA HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
118%	118%	108%	161%	85%	11%	120%	246%	54%	107%	31%	74%	108%
169%	169%	46%	45%	97%	11%	36%	142%	23%	od%	120%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905022230  
 START TIME: 22:31: 0 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.049 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.24E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.160E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.984E-05 [3.0E-05]
Z/L AT GMM -0.059 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.69E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.075E-02 [2.0E-02]
Z/L AT 10 METERS -0.046 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.37E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.036E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.198E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.365E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.43E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.211 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
33%	31%	17%	6%	11%	0%	3%	16%	9%	2%	24%	30%	24%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905022300  
START TIME: 23: 1:20 PST  
END TIME: 23:51:30 PST  
START DATE: 2 May 1979 (DAY 12)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.093	5.109	4.290	4.204	4.887	-0.092	4.977

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	Z/KO REF.	SPARE A	SPARE B	VOLT. REF. B
3.785	3.807	2.520	0.001	0.001	0.001	0.001	6.285

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND 1 AND	DP1FCAL	DP2FCAL	WTRFCAL	W1EC	W2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)		(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 119149	1421 120331	0.183	97		-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1Hz)	(V)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.915	8.27	10.09	NO DATA	314.2	1013.18	1.28E 01	13.432	285.134

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)
12.033	7.88	10.13	NO DATA	0.18	1014.28

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
18.35	12.095	13.235	13.415	9.386E-03	88.60	7.616E-03	12.349	13.938	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
9.20	12.123	13.357	13.447	9.414E-03	88.11	7.633E-03	12.390	14.062	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905022300  
START TIME: 23: 1:20 PST  
START DATE: 2 May 1979 (DAY 12)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (SUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.058 AT GMH	MOMENTUM FLUX (Nt/m2) -8.97E-02	FRICTION VELOCITY (Meters/sec) 2.698E-01	GENERAL FORM: DN/DZ= 1/(N1-N2)/(Ln(Z1/Z2)) (Z1=Z2)1/2	GENERAL FORM: N SLOPE= 1/(Ln(Z1-PSI1)-(Ln(Z2-PSI1))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.34E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.024E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.34E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.48E 00
Z/L AT GMH -0.070	LAT. HEAT FLUX (Watts/m2) 5.70E 01	SCALING POT. TEMP. (Kelvin) -2.502E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.69E 03
Z/L AT 10 METERS -0.054	SEN. HEAT FLUX (Watts/m2) 8.42E 00	ROUGHNESS LENGTH (Meters) 5.406E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.18E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.16E 01
Z/L AT Z1 -0.093	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.334E-05		N=LNTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=MONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.049	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.90E 01			
MONIN OBUKHOV LENGTH (Meters) -1.868E 02				
PSI1 AT Z1= 0.266502 PSI1 AT Z2= 0.151029 PSI2 AT Z1= 0.170837 PSI2 AT Z2= 0.095918	ROMEN RATIO (no units) 0.146			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- 0.08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2330

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9054E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905022300  
 START TIME: 23: 1:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel./m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)	REF. INDEX (Kel./m-2/3)
12.019	7.92	10.12	NO DATA	1014.18	13.432	-1.414	-1.316	-0.090	0.008	

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)
10.00	12.117	13.342	13.440	9.411E-03	88.17	7.631E-03	12.386	14.048

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.091 AT GMH	MOMENTUM FLUX (Nt/m2) -8.93E-02	FRICTION VELOCITY (Meters/sec) 2.691E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.239E-02	AIR DENSITY (Kg/m3) 1.2332
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.36E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.109E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.359E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMH -0.106	LAT. HEAT FLUX (Watts/m2) 5.83E 01	SCALING POT. TEMP. (Kelvin) -4.308E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.159E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9052E 05
Z/L AT 10 METERS -0.082	SEN. HEAT FLUX (Watts/m2) 1.45E 01	ROUGHNESS LENGTH (Meters) 5.350E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.430
MONIN-OBUKHOV LENGTH (Meters) -1.223E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.153E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.56E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.38
	BOWEN RATIO (no units) 0.248			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
144%	144%	136%	178%	106%	10%	130%	283%	68%	110%	38%	88%	136%
168%	168%	46%	46%	96%	10%	35%	142%	23%	69%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905022300  
 START TIME: 23: 1:20 PST  
 START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.073 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.94E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.692E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.35E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.077E-05 [3.0E-05]
Z/L AT GMH -0.086 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.82E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.937E-02 [2.0E-02]
Z/L AT 10 METERS -0.067 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.16E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.368E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.502E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.154E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.47E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.214 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
23%	21%	0%	1%	26%	0%	5%	25%	0%	1%	35%	0%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905022330  
START TIME: 23:31:40 PST  
END TIME: 01:13:00 PST  
START DATE: 2 May 1979 (DAY 122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## # ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.096	5.114	4.225	4.131	4.895	-0.892	4.987
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.777	3.813	2.520	0.001	0.001	0.001	0.001	6.205		

## # DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WT8FCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 119594	1421 120757	0.183	94	-0.009	0.000	0.000	0.992	0.952

## # SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## # OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel.xM-2/3)
11.959	8.14	10.11	NO DATA	314.5	1013.30	1.28E 01	13.425	285.178
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.076	7.74	10.16	NO DATA	0.22	1014.40			

## # CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.139	13.281	13.461	9.398E-03	88.45	7.625E-03	12.366	13.980	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.166	13.402	13.492	9.433E-03	88.05	7.649E-03	12.417	14.103	NO DATA

## # CONTINUED BELOW

RUN NUMBER: 7905022330  
START TIME: 23:31:40 PST  
START DATE: 2 May 1979 (DAY 122)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## # PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.051 AT GHM	MOMENTUM FLUX (Nt/m2) -9.12E-02	FRICTION VELOCITY (Meters/sec) 2.720E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2) * (Z1+Z2)/2]$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1) - (LnZ2-PSI1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.34E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.964E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.43E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.47E 00
Z/L AT GHM -0.062	LAT. HEAT FLUX (Watts/m2) 5.77E 01	SCALING POT. TEMP. (Kelvin) -2.311E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.76E 03
Z/L AT 10 METERS -0.048	SEN. HEAT FLUX (Watts/m2) 7.84E 00	ROUGHNESS LENGTH (Meters) 5.576E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.96E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.34E 01
Z/L AT Z1 -0.088	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.403E-04		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.044	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.84E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.879E 02	BOWEN RATIO (no units) 0.136			
PSI1 AT Z1= 0.245489 PSI1 AT Z2= 0.139725 PSI2 AT Z1= 0.156793 PSI2 AT Z2= 0.887387				

## # GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## # GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2329

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9852E 05

RUN NUMBER: 7905022330  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRIC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.062	7.79	10.15	NO DATA	1014.30	13.425	-1.363	-1.265	-0.037	0.061

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.160	13.388	13.486	9.429E-03	88.10	7.646E-03	12.412	14.089	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.092 AT 6M	MOMENTUM FLUX (Nt/m2) -0.57E-02	FRICTION VELOCITY (Meters/sec) 2.635E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.946E-02	AIR DENSITY (Kg/m3) 1.2332
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.065E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.296E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT 6M -0.108	LAT. HEAT FLUX (Watts/m2) 5.68E 01	SCALING POT. TEMP. (Kelvin) -4.199E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.107E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9049E 05
Z/L AT 10 METERS -0.093	SEN. HEAT FLUX (Watts/m2) 1.38E 01	ROUGHNESS LENGTH (Meters) 4.942E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.424
MONIN-OBUKHOV LENGTH (Meters) -1.204E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.144E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.34E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.50
	BOWEN RATIO (no units) 0.243			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
142%	142%	131%	175%	105%	10%	129%	279%	65%	109%	39%	85%	131%
170%	170%	46%	46%	98%	10%	35%	143%	23%	69%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905022330  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.070 [0.02] AT 6M	MOMENTUM FLUX (Nt/m2) -8.71E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.657E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.30E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.026E-05 [3.0E-05]
Z/L AT 6M -0.093 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.70E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.777E-02 [2.0E-02]
Z/L AT 10 METERS -0.064 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.09E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.155E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.562E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.20E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.23E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.207 [0.09]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
29%	27%	4%	1%	27%	0%	3%	27%	2%	1%	38%	6%	1.2

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905030000  
START TIME: 0:14:00 PST  
END TIME: 0:31:30 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.082	5.100	4.191	4.066	4.901	-0.092	5.048

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.776	3.806	2.521	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118699	1421 119862	0.183	92	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.870	8.98	10.03	NO DATA	316.6	1013.40	1.28E 01	13.424	285.088

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
11.986	7.62	10.08	NO DATA	0.25	1014.47

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.050	13.184	13.364	9.348E-03	88.47	7.582E-03	12.297	13.899	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.076	13.305	13.395	9.305E-03	88.08	7.607E-03	12.351	14.022	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030000  
START TIME: 0:14:00 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.040 AT GMH	MOMENTUM FLUX (Nt/m2) -1.12E-01	FRICTION VELOCITY (Meters/sec) 3.010E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2) * (Z1*Z2)^{1/2}]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1) - (LnZ2-PS1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.54E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.841E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.04E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.33E 00
Z/L AT GMH -0.049	LAT. HEAT FLUX (Watts/m2) 6.21E 01	SCALING POT. TEMP. (Kelvin) -2.279E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -0.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.90E 03
Z/L AT 10 METERS -0.038	SEN. HEAT FLUX (Watts/m2) 8.56E 00	ROUGHNESS LENGTH (Meters) 8.141E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.97E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -2.37E 01
Z/L AT Z1 -0.070	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.75E 03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.035	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.42E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.639E 02	HUMID. RATIO (no units) 0.136			
PS11 AT Z1 = 0.203393 PS11 AT Z2 = 0.113643 PS12 AT Z1 = 0.128875 PS12 AT Z2 = 0.070553				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2335	2.4164E 02	5.9057E 05



RUN NUMBER: 7905030000  
 START TIME: 0: 1:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.972	7.68	10.07	NO DATA	1014.40	13.424	-1.451	-1.353	-0.133	-0.035

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.070	13.290	13.388	9.381E-03	88.13	7.604E-03	12.344	14.007	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.102 AT 6MH	MOMENTUM FLUX (Nt/m2) -8.27E-02	FRICTION VELOCITY (Meters/sec) 2.589E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.702E-02	AIR DENSITY (Kg/m3) 1.2337
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.31E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.239E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.312E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT 6MH -0.119	LAT. HEAT FLUX (Watts/m2) 5.72E 01	SCALING POT. TEMP. (Kelvin) -4.465E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.156E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9054E 05
Z/L AT 10 METERS -0.092	SEN. HEAT FLUX (Watts/m2) 1.44E 01	ROUGHNESS LENGTH (Meters) 4.613E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.424
MONIN-OBUKHOV LENGTH (Meters) -1.092E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.137E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.44E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.60
	BOWEN RATIO (no units) 0.252			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
127%	127%	113%	164%	94%	10%	123%	259%	57%	108%	38%	77%	113%
167%	167%	46%	46%	95%	10%	35%	140%	23%	69%	118%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030000  
 START TIME: 0: 1:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.067 [0.02] AT 6MH	MOMENTUM FLUX (Nt/m2) -9.11E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.711E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.36E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.085E-05 [3.0E-05]
Z/L AT 6MH -0.079 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.84E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.811E-02 [2.0E-02]
Z/L AT 10 METERS -0.061 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.15E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.882E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.636E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.277E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.44E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.212 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
47%	44%	17%	6%	26%	0%	0%	29%	8%	3%	44%	3%	26%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030030  
START TIME: 0:31:40 PST  
END TIME: 1:15:00 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.063	5.083	4.401	4.270	4.891	-0.092	5.086
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.771	3.803	2.520	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118011	1421 119224	0.183	90	-0.009	0.000	0.000	0.992	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.801	8.48	9.92	NO DATA	317.9	1013.25	1.28E 01	13.419	285.022
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
11.922	8.00	9.97	NO DATA	0.28	1014.35			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	11.981	13.105	13.285	9.279E-03	88.21	7.525E-03	12.203	13.834	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.013	13.232	13.322	9.320E-03	87.83	7.553E-03	12.262	13.961	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030030  
START TIME: 0:31:40 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.042 AT GMH	MOMENTUM FLUX (Nt/m2) -1.28E-01	FRICTION VELOCITY (Meters/sec) 3.221E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/1]/[Ln(Z1/Z2)]$	GENERAL FORM: $N SLOPE = [1/(N1-PS1)] - [1/(N2-PS1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.73E-05	SCALING SPEC. HUMID (Kg/Kg) -6.862E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.37E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.24E 00
Z/L AT GMH -0.051	LAT. HEAT FLUX (Watts/m2) 6.74E 01	SCALING POT. TEMP. (Kelvin) -2.714E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.89E 03
Z/L AT 10 METERS -0.040	GEN. HEAT FLUX (Watts/m2) 1.09E 01	ROUGHNESS LENGTH (Meters) 1.042E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.53E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -1.94E 01
Z/L AT Z1 -0.073	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.777E-03		
Z/L AT Z2 -0.036	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.12E 01			
MONIN-ORUKHOV LENGTH (Meters) -2.528E 02	BOWEN RATIO (no units) 0.162			N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT? SLOPE=NO DATA
PS11 AT Z1 = 0.210506 PS11 AT Z2 = 0.117995 PS12 AT Z1 = 0.133569 PS12 AT Z2 = 0.073337				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2336

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/Kg.°K)  
2.4163E 02

WATER LAT. HEAT VAP  
(J/Kg)  
5.9061E 05

RUN NUMBER: 7905030030  
 START TIME: 0:31:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.908	8.06	9.96	NO DATA	1014.25	13.419	-1.511	-1.413	-0.263	-0.105

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.806	13.216	13.314	9.315E-03	87.88	7.550E-03	12.255	13.946	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.092 AT GMH	MOMENTUM FLUX (Nt/m2) -9.30E-02	FRICTION VELOCITY (Meters/sec) 2.745E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.537E-02	AIR DENSITY (Kg/m3) 1.2338
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.49E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.352E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.490E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.108	LAT. HEAT FLUX (Watts/m2) 6.16E 01	SCALING POT. TEMP. (Kelvin) -4.544E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.247E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9058E 05
Z/L AT 10 METERS -0.083	SEN. HEAT FLUX (Watts/m2) 1.56E 01	ROUGHNESS LENGTH (Meters) 5.777E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.418
MONIN-OBUKHOV LENGTH (Meters) -1.207E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.162E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.00E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.45
	BOWEN RATIO (no units) 0.253			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
121%	121%	111%	163%	98%	10%	121%	252%	56%	108%	33%	76%	111%
165%	165%	46%	45%	93%	10%	35%	138%	23%	68%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030030  
 START TIME: 0:31:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.063 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.03E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.885E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.54E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.162E-05 [3.0E-05]
Z/L AT GMH -0.075 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.28E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.117E-02 [2.0E-02]
Z/L AT 10 METERS -0.058 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.32E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.460E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.728E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.330E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.02E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.221 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
40%	38%	18%	5%	18%	0%	1%	21%	9%	4%	34%	32%	26%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905030100  
START TIME: 1: 2: 0 PST  
END TIME: 1:32:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.050	5.068	4.452	4.320	4.884	-0.092	5.058
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.761	3.794	2.520	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W3FCAL	W4FCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 117445	1421 118649	0.183	89	-0.009	0.000	0.000	0.992	0.952	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .15V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.744	8.58	9.84	NO DATA	317.8	1013.14	1.28E 01	13.410	284.965
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.865	8.09	9.89	NO DATA	0.30	1014.24			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.924	13.041	13.221	9.231E-03	88.07	7.485E-03	12.138	13.781	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.955	13.166	13.256	9.267E-03	87.66	7.509E-03	12.190	13.906	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030100  
START TIME: 1: 2: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.040 AT GMH	MOMENTUM FLUX (Nt/m2) -1.29E-01	FRICTION VELOCITY (Meters/sec) 3.239E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(Ln(Z1/Z2) * (Z1+Z2)/2)$	GENERAL FORM: $N SLOPE = (LnZ1-PSI1)-(LnZ2-PSI2)/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.840E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.42E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.24E 00
Z/L AT GMH -0.049	LAT. HEAT FLUX (Watts/m2) 6.76E 01	SCALING POT. TEMP. (Kelvin) -2.632E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.90E 03
Z/L AT 10 METERS -0.038	SEN. HEAT FLUX (Watts/m2) 1.06E 01	ROUGHNESS LENGTH (Meters) 1.062E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.43E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.05E 01
Z/L AT Z1 -0.059	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.77E 00		N=LNTMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTR SLOPE=NO DATA
Z/L AT Z2 -0.035	MONIN-BRUKHUIJ LENGTH (Meters) -2.644E 02			
PSI1 AT Z1= 0.203056 PSI1 AT Z2= 0.113437 PSI2 AT Z1= 0.128651 PSI2 AT Z2= 0.070422	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.11E 01			
	ROSEN RATIO (no units) 0.157			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.01 -3 kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (J/cal./Kg Kel.)	WATER LAT. HEAT VAP. (J/cal./Kg)
1.2338	2.416E 02	5.064E 05

\* (CONTINUED ON NEXT PAGE)

RUN NUMBER: 7905030100  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.850	8.15	9.88	NO DATA	1014.14	13.410	-1.559	-1.461	-0.258	-0.160

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	11.948	13.151	13.249	9.263E-03	87.71	7.507E-03	12.184	13.892	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.091 AT 6M	MOMENTUM FLUX (Nt/m2) -9.57E-02	FRICTION VELOCITY (Meters/sec) 2.785E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.754E-02	AIR DENSITY (Kg/m3) 1.2340
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.57E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.469E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.566E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT 6M -0.107	LAT. HEAT FLUX (Watts/m2) 6.35E 01	SCALING POT. TEMP. (Kelvin) -4.652E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.295E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9061E 05
Z/L AT 10 METERS -0.082	SEN. HEAT FLUX (Watts/m2) 1.62E 01	ROUGHNESS LENGTH (Meters) 6.094E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.406
MONIN-OBUKHOV LENGTH (Meters) -1.212E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.168E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.25E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.34
	BOWEN RATIO (no units) 0.255			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
122%	122%	111%	163%	89%	10%	122%	252%	56%	108%	34%	76%	111%
164%	164%	46%	45%	92%	10%	35%	137%	23%	68%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030100  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.062 (0.02) AT 6M	MOMENTUM FLUX (Nt/m2) -1.06E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.918E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.60E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.224E-05 (3.0E-05)
Z/L AT 6M -0.074 (0.02)	LAT. HEAT FLUX (Watts/m2) 6.44E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.088E-02 (2.0E-02)
Z/L AT 10 METERS -0.057 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.34E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 7.734E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.759E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.347E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.22E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.221 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
42%	40%	17%	4%	21%	0%	1%	23%	8%	4%	37%	30%	45%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030130  
START TIME: 1:32:20 PST  
END TIME: 2: 2:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.069	No.04 DEW POINT2 5.086	No.05 WIND SPEED1 4.165	No.06 WIND SPEED2 4.038	No.07 BAR.PRES.2 4.888	No.08 SKY RAD. -0.092	No.09 WIND DIR. 5.171
No.10 BULK WT TEMP 3.756	No.11 AC FREQUENCY 3.793	No.12 AC VOLTAGE 2.521	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 118323	No.2 AIR TEMP.2 1421 119478	UPWIND NEAR HEIGHT/LENGTH 0.199	UPWIND LAND PATH(Meters) 64	DP1FCAL (Volts) -0.089	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.949
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).5V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.2	AC FREQUENCY (Hz) 59.79
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 11.832	WIND SPEED1 (Meter/sec) 8.83	DEW POINT1 (Celsius) 9.95	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 320.8	BAR.PRES.1 (Millibar) 1013.20	SKY RAD. (Watt/m2) 1.28E 01	BULK WT TEMP (Celsius) 13.484	MEAN AIR TEMP (Kelvin) 285.050
AIR TEMP.2 (Celsius) 11.948	WIND SPEED2 (Meter/sec) 7.55	DEW POINT2 (Celsius) 9.99	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.30	BAR.PRES.2 (Millibar) 1014.30			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.012	VIR.TEMP.1 (Celsius) 13.139	V.POT.TEMP.1 (Celsius) 13.319	ABS.HUMID.1 (Kg/m3) 9.301E-03	REL.HUMID.1 (Percent) 88.25	SPEC.HUMID.1 (Kg/Kg) 7.544E-03	VAP.PRES.1 (Millibar) 12.233	S.VAP.PRES.1 (Millibar) 13.862	REF.INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.038	VIR.TEMP.2 (Celsius) 13.259	V.POT.TEMP.2 (Celsius) 13.349	ABS.HUMID.2 (Kg/m3) 9.332E-03	REL.HUMID.2 (Percent) 87.81	SPEC.HUMID.2 (Kg/Kg) 7.564E-03	VAP.PRES.2 (Millibar) 12.278	S.VAP.PRES.2 (Millibar) 13.984	REF.INDEX 2 (Kel.xM-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030130  
START TIME: 1:32:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.035 AT GHM	MOMENTUM FLUX (Nt/m2) -1.22E-01	FRICTION VELOCITY (Meters/sec) 3.145E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]$ (Z1*Z2)^(1/2)	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.63E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.778E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.34E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.27E 00
Z/L AT GHM -0.043	LAT. HEAT FLUX (Watts/m2) 6.50E 01	SCALING POT. TEMP. (Kelvin) -2.188E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.98E 03
Z/L AT 10 METERS -0.033	SEN. HEAT FLUX (Watts/m2) 8.59E 00	ROUGHNESS LENGTH (Meters) 9.54E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.88E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTX SLOPE= -2.47E 01
Z/L AT Z1 -0.061	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.936E-01		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.038	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.64E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.033E 02	BOWEN RATIO (no units) 0.132			
PSI1 AT Z1= 0.181635 PSI1 AT Z2= 0.108473 PSI2 AT Z1= 0.114571 PSI2 AT Z2= 0.062163				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2334

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9059E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

RUN NUMBER: 7905030130  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M/2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.934	7.61	9.99	NO DATA	1014.21	13.404	-1.470	-1.372	-0.159	-0.061

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M/2/3)
10.00	12.032	13.245	13.343	9.328E-03	87.86	7.561E-03	12.273	13.969	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.106 AT GMM	MOMENTUM FLUX (Nt/m2) -8.08E-02	FRICTION VELOCITY (Meters/sec) 2.559E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.548E-02	AIR DENSITY (Kg/m3) 1.2337
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.33E-05	SCALING SPEC HUMID. (Kg/Kg) -7.371E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.327E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMM -0.124	LAT.HEAT FLUX (Watts/m2) 5.75E 01	SCALING POT.TEMP. (Kelvin) -4.534E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.160E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9056E 05
Z/L AT 10 METERS -0.095	SEN.HEAT FLUX (Watts/m2) 1.45E 01	ROUGHNESS LENGTH (Meters) 4.409E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.402
MONIN-OBUKHOV LENGTH (Meters) -1.051E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.132E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.48E 01			BAR.PRES.AT WT LEVEL (Millibar) 1015.41
	BOWEN RATIO (no units) 0.252			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI.SPEC HUMIDITY	SCI.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
122%	122%	106%	160%	91%	10%	121%	252%	53%	107%	38%	73%	106%
166%	166%	46%	45%	94%	10%	35%	140%	23%	68%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030130  
 START TIME: 1:32:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.065 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -9.33E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.736E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.39E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.140E-05 [3.0E-05]
Z/L AT GMM -0.077 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.92E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -2.766E-02 [2.0E-02]
Z/L AT 10 METERS -0.059 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.15E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.315E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.687E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.35E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.52E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.209 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI.SPEC HUMIDITY	SCI.POT. TEMP.	ROUGH. LENGTH	DRAW COEF
56%	53%	24%	7%	26%	0%	1%	30%	12%	4%	48%	42%	5%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030200  
START TIME: 2: 2:20 PST  
END TIME: 2:32:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.062	5.082	4.309	4.150	4.891	-0.092	5.291
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.744	3.782	2.520	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118459	1421 119656	0.199	64	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.846	8.30	9.91	NO DATA	324.9	1013.25	1.20E 01	13.393	285.066
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
11.966	7.75	9.97	NO DATA	0.30	1014.35			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.026	13.149	13.329	9.275E-03	87.92	7.523E-03	12.200	13.875	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.056	13.275	13.365	9.316E-03	87.55	7.551E-03	12.258	14.801	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905030200  
START TIME: 2: 2:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.031 AT GHM	MOMENTUM FLUX (Nt/m2) -1.57E-01	FRICTION VELOCITY (Meters/sec) 3.563E-01	GENERAL FORM: $DN/DZ = ((N1-N2)/(\ln(Z1/Z2))) * (Z1/Z2)^{1/2}$	GENERAL FORM: $N' SLOPE = ((\ln Z1 - \ln Z2) - (\ln Z2 - \ln Z1)) / (\ln Z1 - \ln Z2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.96E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.730E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.12E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.12E 00
Z/L AT GHM -0.03d	LAT. HEAT FLUX (Watts/m2) 7.31E 01	SCALING POT. TEMP. (Kelvin) -2.523E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.03E 03
Z/L AT 10 METERS -0.029	SEN. HEAT FLUX (Watts/m2) 1.12E 01	ROUGHNESS LENGTH (Meters) 1.492E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.34E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.14E 01
Z/L AT Z1 -0.054	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 2.305E 03		N=LNTMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.027	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.72E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.404E 02	ROSEN RATIO (no units) 0.153			
PSI1 AT Z1 = 0.165112 PSI1 AT Z2 = 0.090620 PSI2 AT Z1 = 0.103775 PSI2 AT Z2 = 0.055919				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2334

AIR SPECIFIC HEAT  
(J/Kel. /Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(J/Kel. /Kg)  
5.4058E 03

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905030200  
 START TIME: 2: 2:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.951	7.82	9.96	NO DATA	1014.25	13.393	-1.442	-1.344	-0.134	-0.036

HFIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.049	13.259	13.357	9.311E-03	87.60	7.547E-03	12.251	13.986	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICH. USON NUMBER (+=Stable,-=Unstable) -0.096 AT GMH	MOMENTUM FLUX (Nt/m2) -8.64E-02	FRICTION VELOCITY (Meters/sec) 2.647E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.006E-02	AIR DENSITY (Kg/m3) 1.2337
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.40E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.357E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.402E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.112	LAT.HEAT FLUX (Watts/m2) 5.94E 01	SCALING POT.TEMP. (Kelvin) -4.408E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.167E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9755E 05
Z/L AT 10 METERS -0.086	SEN.HEAT FLUX (Watts/m2) 1.46E 01	ROUGHNESS LENGTH (Meters) 5.025E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.391
MONIN-OBUKHOV LENGTH (Meters) -1.157E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.146E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.68E 01			BAR.PRES.AT WT LEVEL (Millibar) 1015.45
	BOWEN RATIO (no units) 0.245			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
109%	109%	95%	154%	81%	10%	116%	234%	47%	106%	33%	67%	95%
167%	167%	46%	45%	95%	10%	35%	140%	23%	68%	118%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030200  
 START TIME: 2: 2:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable,-=Unstable) -0.056 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.09E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.946E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.53E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.112E-05 [3.8E-05]
Z/L AT GMH -0.067 [0.02]	LAT.HEAT FLUX (Watts/m2) 6.25E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -2.936E-02 [2.0E-02]
Z/L AT 10 METERS -0.052 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.27E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.879E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.928E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.450E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.92E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.711 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
59%	56%	34%	13%	13%	0%	7%	22%	16%	5%	37%	57%	46%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030230  
START TIME: 2:32:20 PST  
END TIME: 3:23:30 PST  
START DATE: 3 May 1977 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE UDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.061	5.077	4.086	3.946	4.890	-0.092	5.429
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.732	3.783	2.521	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W3FCAL	W4FCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 117794	1421 118966	0.199	65	-0.009	0.000	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.779	7.88	9.90	NO DATA	329.6	1013.23	1.28E 01	13.381	284.998
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.897	7.38	9.94	NO DATA	0.27	1014.32			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.959	13.082	13.262	9.273E-03	88.27	7.519E-03	12.194	13.814	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.987	13.203	13.293	9.298E-03	87.77	7.535E-03	12.232	13.937	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030230  
START TIME: 2:32:20 PST  
START DATE: 3 May 1977 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034	MOMENTUM FLUX (Nt/m2) -1.30E-01	FRICTION VELOCITY (Meters/sec) 3.252E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(Z1/Z2) * (Z1+Z2)/2$	GENERAL FORM: $N' SLOPE = (LN(Z1-PSI) - LN(Z2-PSI)) / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.777E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.52E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.23E 00
Z/L AT GMH -0.043	LAT. HEAT FLUX (Watts/m2) 6.72E 01	SCALING POT. TEMP. (Kelvin) -2.335E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.98E 03
Z/L AT 10 METERS -0.033	SEN. HEAT FLUX (Watts/m2) 9.48E 00	ROUGHNESS LENGTH (Meters) 1.077E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.07E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.31E 01
Z/L AT Z1 -0.060	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF. AT 10 METERS (Dimensionless) 2.10E-03		N=LN TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.030	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.95E 01			
MONTGOMERY LENGTH (Meters) -3.038E 02	ROMEN RATIO (no units) 0.141			
PSI1 AT Z1 = 0.181394 PSI1 AT Z2 = 0.100329 PSI2 AT Z1 = 0.114414 PSI2 AT Z2 = 0.060072				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2+/- 0.0F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2337

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9862E 03

RUN NUMBER: 7905030230  
 START TIME: 2:32:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK W1 TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.882	7.44	9.93	NO DATA	1014.23	13.381	-1.499	-1.401	-0.193	-0.095

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	11.980	13.188	13.286	9.295E-03	87.83	7.533E-03	12.228	13.922	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.116 AT GMH	MOMENTUM FLUX (Nt/m2) -7.66E-02	FRICTION VELOCITY (Meters/sec) 2.491E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.204E-02	AIR DENSITY (Kg/m3) 1.2339
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.459E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.293E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.134	LAT. HEAT FLUX (Watts/m2) 5.67E 01	SCALING POT. TEMP. (Kelvin) -4.652E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.159E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9059E 05
Z/L AT 10 METERS -0.103	SEN. HEAT FLUX (Watts/m2) 1.45E 01	ROUGHNESS LENGTH (Meters) 3.965E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.379
MONIN-OBUKHOV LENGTH (Meters) -9.701E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.121E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.40E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.43
	BOWEN RATIO (no units) 0.255			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
115%	115%	100%	157%	86%	10%	118%	243%	50%	107%	36%	70%	100%
166%	166%	46%	45%	94%	10%	35%	139%	23%	68%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030230  
 START TIME: 2:32:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.068 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -9.35E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.730E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.39E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.194E-05 [3.0E-05]
Z/L AT GMH -0.080 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.90E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.882E-02 [2.0E-02]
Z/L AT 10 METERS -0.062 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.19E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.553E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.621E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.418E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.52E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.214 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
61%	58%	31%	18%	21%	0%	4%	28%	15%	5%	45%	53%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030300  
START TIME: 3: 24:00 PST  
END TIME: 3:32:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUCT. 1 0.000	No. 02 TEMP. STRUCT. 2 0.001	No. 03 DEW POINT 1 5.080	No. 04 DEW POINT 2 5.095	No. 05 WIND SPEED 1 3.692	No. 06 WIND SPEED 2 3.558	No. 07 BAR. PRES. 2 4.899	No. 08 SKY RAD. -0.092	No. 09 WIND DIR. 5.474
No. 10 BULK WT TEMP 5.725	No. 11 AIR TEMP 3.797	No. 12 AC VOLTAGE 2.522	No. 13 ANNUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 117692	No. 2 AIR TEMP. 2 1421 119089	UPWIND NEAR HEIGHT/LENGTH 0.206	UPWIND LAND PATH (Meters) 54	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1LC (Coeff.) 0.991	WS2EC (Coeff.) 0.947
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA RATE (No. scans) 140	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	ZERO REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC FREQ. FLUX (No. scans) 0	AC VOLTAGE (VAC) 115.2	AC FREQUENCY (Hz) 59.79
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 11.789	WIND SPEED 1 (Meter/sec) 7.11	DEW POINT 1 (Celsius) 10.02	TEMP. STRUCT. 1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 331.1	BAR. PRES. 1 (Millibar) 1013.37	SKY RAD. (Watt/m2) 1.28E 01	BULK WT TEMP (Celsius) 13.375	MEAN AIR TEMP (Kelvin) 265.009
AIR TEMP. 2 (Celsius) 11.909	WIND SPEED 2 (Meter/sec) 6.66	DEW POINT 2 (Celsius) 10.04	TEMP. STRUCT. 2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.23	BAR. PRES. 2 (Millibar) 1014.47			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 11.969	VIR. TEMP. 1 (Celsius) 13.102	V. POT. TEMP. 1 (Celsius) 13.282	ABS. HUMID. 1 (Kg/m3) 9.344E-03	REL. HUMID. 1 (Percent) 88.88	SPEC. HUMID. 1 (Kg/Kg) 7.576E-03	VAP. PRES. 1 (Millibar) 12.287	S. VAP. PRES. 1 (Millibar) 13.825	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 11.999	VIR. TEMP. 2 (Celsius) 13.224	V. POT. TEMP. 2 (Celsius) 13.315	ABS. HUMID. 2 (Kg/m3) 9.367E-03	REL. HUMID. 2 (Percent) 88.33	SPEC. HUMID. 2 (Kg/Kg) 7.590E-03	VAP. PRES. 2 (Millibar) 12.323	S. VAP. PRES. 2 (Millibar) 13.950	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030300  
START TIME: 3: 24:00 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.044 AT GMH	MOMENTUM FLUX (Nt/m2) -1.16E-01	FRICTION VELOCITY (Meters/sec) 3.063E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(1+(Z1/Z2)^2)]$	GENERAL FORM: $N'SLOPE = [(LN Z1 - PSI1) - (LN Z2 - PSI1)] / (N1 - N2)$
ISOMETRIC MEAN HEIGHT (Meter) GMH = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.60E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.890E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.07E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.31E 00
Z/L AT GMH -0.054	LAT. HEAT FLUX (Watts/m2) 6.44E 01	SCALING POT. TEMP. (Kelvin) -2.580E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.85E 03
Z/L AT 10 METERS -0.042	SEN. HEAT FLUX (Watts/m2) 9.86E 00	ROUGHNESS LENGTH (Meters) 8.670E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.34E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.10E 01
Z/L AT Z1 -0.077	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.41E-03		N=LN TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.038	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.71E 01			
MINIM-OBSTRUCTION LENGTH (Meters) -2.591E 02	BOWEN RATIO (no units) 0.153			
PSI1 AT Z1 = 0.220016 PSI1 AT Z2 = 0.123849 PSI2 AT Z1 = 0.139861 PSI2 AT Z2 = 0.077088				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2338

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- 0.8F-3 Kg/Kg.

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9061E 05

RUN NUMBER: 7905030300  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel./m-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WI TEMP (Kelvin)	POT-WI TEMP (Kelvin)	VIR-WI TEMP (Kelvin)	V.POT-WI TEMP (Kelvin)
11.894	6.71	10.04	NO DATA	1014.37	13.375	-1.480	-1.382	-0.165	-0.067

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel./m-2/3)
10.00	11.992	13.210	13.308	9.364E-03	88.40	7.588E-03	12.319	13.935	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.156 AT GMH	MOMENTUM FLUX (Nt/m2) -5.97E-02	FRICTION VELOCITY (Meters/sec) 2.199E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.835E-02	AIR DENSITY (Kg/m3) 1.2340
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.00E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.388E-05	WITH ABS HUMIDITY (Meter Kg/sec m3) 2.005E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.177	LAT.HEAT FLUX (Watts/m2) 4.96E 01	SCALING POT.TEMP. (Kelvin) -4.791E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.054E-02	WATER LAT HEAT VAP. (ITcal./Kg) 5.9059E 05
Z/L AT 10 METERS -0.136	SEN.HEAT FLUX (Watts/m2) 1.32E 01	ROUGHNESS LENGTH (Meters) 2.377E-05		VAP.PRES. AT WT LEVEL (Millibar) 15.375
MONIN-OBUKHOV LENGTH (Meters) -7.341E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COFF. AT 10 METERS (Dimensionless) 1.073E-03		ABS.HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.56E 01			BAR.PRES. AT WT LEVEL (Millibar) 1015.57
	BOWEN RATIO (no units) 0.265			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL SPEC HUMIDITY	SCL POT. TEMP.	ROUGH. LENGTH	DRAW (COEF.)
111%	111%	99%	157%	83%	10%	116%	240%	49%	107%	34%	69%	99%
166%	166%	46%	46%	94%	10%	34%	140%	23%	69%	117%	41%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030300  
 START TIME: 3: 2:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.089 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -7.75E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.473E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.14E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.194E-05 [3.0E-05]
Z/L AT GMH -0.104 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.29E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.075E-02 [2.0E-02]
Z/L AT 10 METERS -0.080 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.14E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.783E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.254E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAW COFF. AT 10 METERS (Meters) 1.073E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.02E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.224 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL SPEC HUMIDITY	SCL POT. TEMP.	ROUGH. LENGTH	DRAW (COEF.)
64%	60%	39%	16%	14%	0%	8%	26%	19%	4%	41%	54%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905030330  
START TIME: 3:33: 0 PST  
END TIME: 4: 2:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUC. 1 0.000	No. 02 TEMP. STRUC. 2 0.001	No. 03 DEW POINT 1 5.133	No. 04 DEW POINT 2 5.143	No. 05 WIND SPEED 1 3.223	No. 06 WIND SPEED 2 3.177	No. 07 BAR. PRES. 2 4.912	No. 08 SKY RAD. -0.092	No. 09 WIND DIR. 5.232
No. 10 BULK WT TEMP 3.719	No. 11 AC FREQUENCY 3.788	No. 12 AC VOLTAGE 2.520	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 119850	No. 2 AIR TEMP. 2 1421 120934	UPWIND NEAR HEIGHT/LENGTH 0.199	UPWIND 1 AND PATH (Meters) 70	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.949
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV A (No.) .005V 0	VOLT. REF. DEV R (No.) .005V 0	ZERO REF. DEV (No.) .002V 0	AC VOLT. FLUX (No.) 1Hz 0	AC FREQ. FLUX (VAC) 115.2	AC VOLTAGE (Hz) 59.79
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 11.985	WIND SPEED 1 (Meter/sec) 6.22	DEW POINT 1 (Celsius) 10.33	TEMP. STRUC. 1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 322.9	BAR. PRES. 1 (Millibar) 1013.56	SKY RAD. (Watt/m2) 1.28E 01	BULK WT TEMP (Celsius) 13.368	MEAN AIR TEMP (Kelvin) 285.199
AIR TEMP. 2 (Celsius) 12.093	WIND SPEED 2 (Meter/sec) 5.98	DEW POINT 2 (Celsius) 10.33	TEMP. STRUC. 2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.17	BAR. PRES. 2 (Millibar) 1014.66			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 12.165	VIR. TEMP. 1 (Celsius) 13.327	V. POT. TEMP. 1 (Celsius) 13.506	ABS. HUMID. 1 (Kg/m3) 9.539E-03	REL. HUMID. 1 (Percent) 89.61	SPEC. HUMID. 1 (Kg/Kg) 7.739E-03	VAP. PRES. 1 (Millibar) 12.552	S. VAP. PRES. 1 (Millibar) 14.008	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 12.184	VIR. TEMP. 2 (Celsius) 13.436	V. POT. TEMP. 2 (Celsius) 13.526	ABS. HUMID. 2 (Kg/m3) 9.544E-03	REL. HUMID. 2 (Percent) 89.96	SPEC. HUMID. 2 (Kg/Kg) 7.736E-03	VAP. PRES. 2 (Millibar) 12.565	S. VAP. PRES. 2 (Millibar) 14.123	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030330  
START TIME: 3:33: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUNINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.097 AT GHM	MOMENTUM FLUX (Nt/m2) -4.04E-02	FRICTION VELOCITY (Meters/sec) 1.811E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[Ln(Z1/Z2)* (Z1*Z2)]/2	GENERAL FORM: N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.64E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.357E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.72E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 2.21E 00
Z/L AT GHM -0.113	LAT. HEAT FLUX (Watts/m2) 4.06E 01	SCALING POT. TEMP. (Kelvin) -1.729E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.35E 03
Z/L AT 10 METERS -0.087	SEN. HEAT FLUX (Watts/m2) 3.91E 00	ROUGHNESS LENGTH (Meters) 9.690E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.10E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.13E 01
Z/L AT Z1 -0.160	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.150E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.080	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.73E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.145E 02	BOWEN RATIO (no units) 0.096			
PSI1 AT Z1= 0.380326 PSI1 AT Z2= 0.228894 PSI2 AT Z1= 0.247879 PSI2 AT Z2= 0.145212				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2331

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9050E 05

RUN NUMBER: 7905030330  
 START TIME: 3:33: 0 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
12.080	6.00	10.33	NO DATA	1014.56	13.368	-1.288	-1.190	0.054	0.152

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.178	13.422	13.520	9.544E-03	89.04	7.738E-03	12.564	14.110	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.191 AT GMM	MOMENTUM FLUX (Nt/m2) -4.56E-02	FRICTION VELOCITY (Meters/sec) 1.924E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.701E-02	AIR DENSITY (Kg/m3) 1.2333
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.65E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.950E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.649E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -0.215	LAT. HEAT FLUX (Watts/m2) 4.08E 01	SCALING POT. TEMP. (Kelvin) -4.457E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.573E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9048E 05
Z/L AT 10 METERS -0.165	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 1.302E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.371
MONIN-OBUKHOV LENGTH (Meters) -6.845E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.026E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.162E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.42E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.76
	ROSEN RATIO (no units) 0.262			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
183%	183%	169%	199%	141%	10%	141%	340%	84%	114%	57%	104%	169%
172%	172%	46%	47%	100%	10%	34%	147%	23%	70%	173%	44%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030330  
 START TIME: 3:33: 0 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.145 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -4.45E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.900E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.65E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.105E-05 [3.0E-05]
Z/L AT GMM -0.166 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.07E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.591E-02 [2.0E-02]
Z/L AT 10 METERS -0.128 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.88E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.205E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.841E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.050E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.29E 01 [3.0E+01]	
	ROSEN RATIO (no units) 0.212 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
32%	31%	5%	0%	44%	0%	6%	42%	3%	3%	56%	3%	

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030400  
START TIME: 4: 3: 0 PST  
END TIME: 4:32:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.168	5.178	3.053	3.021	4.922	-0.092	5.101

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.719	3.753	2.522	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121486	1421 122511	0.183	103	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.) .005V	B(No.) .005V	(No.) .002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.75

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.149	5.89	10.54	NO DATA	318.4	1013.72	1.28E 01	13.369	285.360

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.251	5.71	10.54	NO DATA	0.10	1014.82

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.328	13.510	13.690	9.667E-03	89.88	7.847E-03	12.729	14.162	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.341	13.613	13.703	9.675E-03	89.28	7.847E-03	12.743	14.273	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030400  
START TIME: 4: 3: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.116 AT GHM	MOMENTUM FLUX (Nt/m2) -2.44E-02	FRICTION VELOCITY (Meters/sec) 1.407E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1+Z2)1/2	GENERAL FORM: N'SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.489E-05	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis DWS/DZ = 2.05E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.84F 00
Z/L AT GHM -0.134	LAT. HEAT FLUX (Watts/m2) 3.21E 01	SCALING POT. TEMP. (Kelvin) -1.203E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.22E 03
Z/L AT 10 METERS -0.103	SEN. HEAT FLUX (Watts/m2) 2.11E 00	ROUGHNESS LENGTH (Meters) 2.256E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.43E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -4.49E 01
Z/L AT Z2 -0.095	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAW COEF. AT 10 METERS (Dimensionless) 7.077E 04		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MONIN-ORUKHOV LENGTH (Meters) -9.695E 01	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.70E 01			
PS11 AT Z1 = 0.426130 PS11 AT Z2 = 0.259581 PS12 AT Z1 = 0.279225 PS12 AT Z2 = 0.166204	BOWEN RATIO (no units) 0.066			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92F-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2325

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4169E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9041E 05



RUN NUMBER: 7905030400  
 START TIME: 4: 3: 0 PM  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.239	5.73	10.54	NO DATA	1014.72	13.369	-1.130	-1.032	0.232	0.330

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.337	13.600	13.698	9.674E-03	89.35	7.847E-03	12.742	14.260	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.196 AT GMM	MOMENTUM FLUX (Nt/m2) -4.08E-02	FRICTION VELOCITY (Meters/sec) 1.820E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.311E-02	AIR DENSITY (Kg/m3) 1.2328
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.48E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.584E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.477E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4170E 02
Z/L AT GMM -0.220	LAT. HEAT FLUX (Watts/m2) 3.65E 01	SCALING POT. TEMP. (Kelvin) -4.089E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 7.441E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
Z/L AT 10 METERS -0.170	SEN. HEAT FLUX (Watts/m2) 9.28E 00	ROUGHNESS LENGTH (Meters) 9.927E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.374
MONIN-OBUKHOV LENGTH (Meters) -5.899E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.008E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.86E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.92
	BOWEN RATIO (no units) 0.254			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
239%	239%	216%	228%	190%	10%	156%	418%	108%	120%	82%	128%	216%
178%	178%	46%	48%	106%	10%	35%	155%	23%	71%	129%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030400  
 START TIME: 4: 3: 0 PM  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.162 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -3.79E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.747E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.45E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 6.92E-05 [3.0E-05]
Z/L AT GMM -0.183 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.57E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.323E-02 [2.0E-02]
Z/L AT 10 METERS -0.141 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.71E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.998E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.086E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.28E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 9.73E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.65E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.203 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	24%	16%	7%	56%	0%	12%	51%	14%	7%	64%	7%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030430  
START TIME: 4:33: 0 PST  
END TIME: 5: 3:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.154	5.167	3.201	3.154	4.948	0.090	5.190
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.717	3.600	2.522	0.001	0.001	0.001	0.001	6.195		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR		UPWIND LAND	DP1/CAL	DP2/CAL	W1P/CAL	W2P/CAL	W3P/CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH		PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 121904	1421 122915	0.183		108	-0.009	0.008	0.000	0.992	0.990

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLT. FLUX	AC FREQ. FLUX
(No. scans)	(No. scans)	(No. scans)	A(No. 1.005V)	B(No. 1.005V)	(No. 1.002V)	(No. 15V)	(No. 1Hz)	(No. 15V)	(No. 1Hz)
0	0	180	0	0	0	0	0	115.2	115.2

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Deg True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin-273)
12.190	6.18	10.46	NO DATA	318.1	1014.11	1.261 01	14.366	105.401
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Meter ASL)	(Millibar)			
12.291	5.95	10.48	NO DATA	0.02	1015.21			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
18.35	12.370	13.545	13.724	9.618E-03	89.16	7.805E-03	1.2 655	14.206	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
9.20	12.382	13.648	13.738	9.636E-03	88.67	7.814E-03	1.2 694	14.317	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030430  
START TIME: 4:33: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCH WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.069 AT CMH	MOMENTUM FLUX (Nt/m2) -3.16E-02	FRICTION VELOCITY (Meters/sec) 1.602E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1+(Z1-Z2)^2)^{1/2}$	GENERAL FORM: $DN/DZ = (N1-N2)/(1+(Z1-Z2)^2)^{1/2}$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec m2) 1.41E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.127E-05	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) $DSH/DZ = 2.52E-02$	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.50E-00
Z/L AT CMH -0.082	LAT. HEAT FLUX (Watts/m2) 3.41E 01	SCALING POT. TEMP. (Kelvin) -1.020E-02	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) $DSH/DZ = 8.92E-06$	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert. Axis PS1=PS11 SH SLOPE = 7.50E-03
Z/L AT 10 METERS 0.063	SEN. HEAT FLUX (Watts/m2) 2.04E 00	ROUGHNESS LENGTH (Meters) 5.019E-06	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) $DPT/DZ = -1.28E-03$	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert. Axis PS1=PS12 PTR SLOPE = 5.30E-01
Z/L AT Z1 0.116	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 2.14E-04		N= LAT. TEMP. STRUCT. (K/M 2/3) Z= HEIGHT (M) Vert. Axis PS1=NONE CL SLOPE=NO DATA
Z/L AT Z2 -0.058	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.94E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.587E 02	BOWEN RATIO (no units) 0.059			
PS11 AT Z1= 0.301107 PS11 AT Z2= 0.125329 PS12 AT Z1= 0.194102 PS12 AT Z2= 0.110444				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL NUMBER	PRANDTL NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation exceeded by more than 10% of:

SHI SHI +/- 0.08 3 Kg/Kg

## \* MISCELLANEOUS:

AIR DENSITY  
(Kg/m3)  
1.2328

AIR SPECIFIC HEAT  
(J/Kg K)  
2.416E 02

WATER LAT. HEAT CAP.  
(J/Kg K)  
5.987E 03

RUN NUMBER: 7905030430  
 START TIME: 4:33: 0 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

• ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.279	5.98	10.47	NO DATA	1015.11	13.366	-1.067	-0.989	0.269	0.367

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.377	13.635	13.733	9.634E-03	88.73	7.813E-03	12.691	14.304	NO DATA

• BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.167 AT GMM	MOMENTUM FLUX (Nt/m2) -4.52E-02	FRICTION VELOCITY (Meters/sec) 1.914E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.662E-02	AIR DENSITY (Kg/m3) 1.2331
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.57E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.672E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.575E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMM -0.189	LAT. HEAT FLUX (Watts/m2) 3.89E 01	SCALING POT. TEMP. (Kelvin) -3.888E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.441E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9037E 05
Z/L AT 10 METERS -0.146	SEN. HEAT FLUX (Watts/m2) 9.28E 00	ROUGHNESS LENGTH (Meters) 1.270E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.378
MONIN-OBUKHOV LENGTH (Meters) -6.862E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.025E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.08E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.31
	BOWEN RATIO (no units) 0.239			

• MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR, AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
220%	220%	181%	206%	176%	11%	145%	382%	91%	116%	85%	111%	181%
181%	181%	46%	48%	109%	11%	35%	157%	23%	71%	132%	43%	40%

• CONTINUED BELOW

RUN NUMBER: 7905030430  
 START TIME: 4:33: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

• COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT IF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.123 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -4.24E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.851E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.54E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.845E-05 [3.0E-05]
Z/L AT GMM -0.141 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.81E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.149E-02 [2.0E-02]
Z/L AT 10 METERS -0.108 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.52E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.055E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.22E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.005E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.84E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.186 [0.08]	

AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE

GRAD. RICH.	Z/L	MOMENTUM	LAT. HEAT	SEN. HEAT	SKY RAD.	TOTAL HEAT	BOWEN	FRICTION	SCL. SPEC.	SCL. POT.	ROUGH.	DRAG
181%	181%	46%	48%	109%	11%	35%	157%	23%	71%	132%	43%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 290405000  
START TIME: 04:30 PST  
END TIME: 05:30 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ABOVE DE CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND DIR. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.000	0.001	5.15V	5.171	3.095	3.072	4.966	-0.050	5.084

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
LOG. WT. TEMP.	AC. FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
0.001	3.291	2.522	0.001	0.001	0.001	0.001	6.205

## \* ESCARPMENT CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1421 123960	1421 123925	0.183	115	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

PARTIAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.065V)	B (No. 0.055V)	(No. 0.002V)	(No. 15V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.47	5.97	10.49	NO DATA	317.8	1014.39	6.99E-00	13.360	285.504

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)
12.773	5.81	10.50	NO DATA	-0.07	1015.48

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

REL. HUM. 1	POT. TEMP. 1	WIND TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Percent)	(Celsius)	(Celsius)	(Kelvin 2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
88.71	12.47	13.653	13.833	9.656E-03	88.71	7.820E-03	12.694	14.309	NO DATA

REL. HUM. 2	POT. TEMP. 2	WIND TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Percent)	(Celsius)	(Celsius)	(Kelvin 2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
88.23	12.403	13.720	13.842	9.652E-03	88.23	7.820E-03	12.720	14.416	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 2905040500  
START TIME: 05:30 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (=Stable, =Unstable) -0.083 AT 0M	MOMENTUM FLUX (Nt/m2) -1.92E-02	FRICTION VELOCITY (Meters/sec) 1.247E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(LN(Z1/Z2))] * (Z1+Z2)^(1/2)	GENERAL FORM: 'M' SLOPE = [(LN(Z1-PSI)) - (LN(Z2-PSI))] / (LN(N2))
GEOMETRIC MEAN HEIGHT (Meters) GMH = (Z1+Z2)/2 12.29	HUMIDITY FLUX (Kg/sec m2) 1.11E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.251E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.91E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.21E-00
Z/L AT 0M -0.099	LAT. HEAT FLUX (Watts/m2) 2.76E-01	SCALING POT. TEMP. (Kelvin) -7.251E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.44E-03
Z/L AT 10 METERS -0.076	SEN. HEAT FLUX (Watts/m2) 1.13E-00	ROUGHNESS LENGTH (Meters) 9.487E-07	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -7.44E-01
Z/L AT Z1 -0.152	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.99E-00	DRAG COEF. AT 10 METERS (Dimensionless) 1.273E-04		N=LAT. HEAT FLUX (K/m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.070	TOTAL HEAT FLUX (Watts/m2) 3.57E-01			
MININ DRUKHOV LENGTH (Meters) -1.324E-02	BOWEN RATIO (No units) 0.041			
PSI1 AT Z1: 0.143954 PSI1 AT Z2: 0.293312 PSI2 AT Z1: 0.222837 PSI2 AT Z2: 0.120020				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7979	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
---	--	---	---	--	---

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2327

AIR SPECIFIC HEAT  
(Jcal./Kg. Kel.)  
2.4169E-02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9033E-05

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 // 0.013 Kg/Kg  
PTK1 PTK2 // 0.000 Kel

RUN NUMBER: 7905030500  
 START TIME: 5: 3:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 1-N METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.381	5.82	10.50	NO DATA	1015.39	13.360	-0.979	-0.8H1	0.379	0.477

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.479	13.740	13.838	9.650E-03	88.29	7.827E-03	12.717	14.404	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.166 AT 10M	MOMENTUM FLUX (Nt/m2) -4.24E-02	FRICTION VELOCITY (Meters/sec) 1.855E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.439E-02	AIR DENSITY (Kg/m3) 1.2330
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.52E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.648E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.520E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT 10M -0.188	LAT. HEAT FLUX (Watts/m2) 3.76E 01	SCALING POT. TEMP. (Kelvin) -3.625E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.722E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9031E 05
Z/L AT 10 METERS -0.145	SEN. HEAT FLUX (Watts/m2) 8.39E 00	ROUGHNESS LENGTH (Meters) 1.091E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.376
MONIN-OBUKHOV LENGTH (Meters) -6.915E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.99E 00	DRAW COEF. AT 10 METERS (Dimensionless) 1.014E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.30E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.59
	BOWEN RATIO (no units) 0.223			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF
292%	292%	236%	240%	240%	15%	185%	479%	118%	122%	122%	138%	236%
187%	187%	46%	48%	115%	15%	39%	163%	23%	71%	138%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030500  
 START TIME: 5: 3:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.134 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -3.86E 02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.755E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.45E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.871E-05 [3.0E-05]
Z/L AT 10M -0.153 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.59E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.086E-02 [2.0E-02]
Z/L AT 10 METERS -0.118 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.04E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.539E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -8.497E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.99E 00 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 9.541E 04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.00E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.177 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF
32%	30%	21%	17%	64%	0%	21%	57%	21%	5%	70%	9%	2%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030530  
START TIME: 5:33:40 PST  
END TIME: 6:33:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.142	5.154	3.429	3.379	4.991	0.046	5.097
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.705	3.933	2.521	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122775	1421 123797	0.183	121	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	VOLT. REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.93

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.277	6.61	10.38	NO DATA	318.3	1014.78	-6.35E 00	13.355	285.489
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.380	6.36	10.40	NO DATA	-0.16	1015.87			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.457	13.625	13.805	9.573E-03	88.20	7.766E-03	12.610	14.297	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.470	13.729	13.819	9.588E-03	87.69	7.773E-03	12.635	14.409	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030530  
START TIME: 5:33:40 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (++UP, --DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (++INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (++Stable, --Unstable) -0.061 AT GMM	MOMENTUM FLUX (Nt/m2) -3.77E-02	FRICTION VELOCITY (Meters/sec) 1.749E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(\ln(Z1/Z2))] * (Z1+Z2)/2$	GENERAL FORM: $N'SLOPE = [(\ln Z1 - PSI1) - (\ln Z2 - PSI1)] / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.52E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.058E -5	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.79E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.29E 00
Z/L AT GMM -0.073	LAT. HEAT FLUX (Watts/m2) 3.76E 01	SCALING POT. TEMP. (Kelvin) -1.106E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.66E 03
Z/L AT 10 METERS -0.057	SEN. HEAT FLUX (Watts/m2) 2.41E 00	ROUGHNESS LENGTH (Meters) 8.117E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.40E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -4.89E 01
Z/L AT Z1 -0.104	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.35E 00	DRAQ COEF. AT 10 METERS (Dimensionless) 9.305E-04		N=LNTMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.052	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.37E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.769E 02	BOWEN RATIO (no units) 0.064			
PSI1 AT Z1= 0.277700 PSI1 AT Z2= 0.169193 PSI2 AT Z1= 0.178348 PSI2 AT Z2= 0.100572				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2333

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4168E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9034E 05

RUN NUMBER: 7905030530  
 START TIME: 5:33:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.367	8.39	10.40	NO DATA	1015.78	13.355	-0.988	-0.890	0.362	0.460

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.465	13.717	13.815	9.587E-03	87.75	7.772E-03	12.633	14.396	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.126 AT GMH	MOMENTUM FLUX (Nt/m2) -5.31E-02	FRICTION VELOCITY (Meters/sec) 2.074E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.301E-02	AIR DENSITY (Kg/m3) 1.2336
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.737E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.723E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.145	LAT. HEAT FLUX (Watts/m2) 4.26E 01	SCALING POT. TEMP. (Kelvin) -3.488E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.233E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9032E 05
Z/L AT 10 METERS -0.111	SEN. HEAT FLUX (Watts/m2) 9.03E 00	ROUGHNESS LENGTH (Meters) 1.840E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.376
MONIN-OBUKHOV LENGTH (Meters) -8.985E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.35E 00	DRAG COEF. AT 10 METERS (Dimensionless) 1.052E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.53E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.98
	BOWEN RATIO (no units) 0.212			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-"

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
209%	209%	174%	201%	165%	16%	163%	366%	87%	114%	78%	107%	174%
186%	186%	46%	48%	114%	16%	39%	162%	23%	71%	137%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030530  
 START TIME: 5:33:40 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARETHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.095 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -4.98E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.006E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.69E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.860E-05 (3.0E-05)
Z/L AT GMH -0.111 (0.02)	LAT. HEAT FLUX (Watts/m2) 4.16E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.970E-02 (2.0E-02)
Z/L AT 10 METERS -0.085 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.32E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.545E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.178E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.35E 00 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.027E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.30E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.167 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
34%	32%	15%	7%	53%	0%	16%	48%	9%	2%	62%	9%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030600  
START TIME: 6:4:0 PST  
END TIME: 6:34:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.120	5.133	3.595	3.534	5.011	0.193	5.017
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.703	3.886	2.522	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120752	1421 121849	0.183	128	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) 0.05V	B(No.) 0.05V	(No.) 0.02V	(No.) 75V	(No.) 1Hz	(V)	(Hz)
0	0	180	0	0	0	0	0	113.2	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.075	6.93	10.25	NO DATA	315.6	1015.09	-2.69E 01	13.353	285.290
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.185	6.85	10.27	NO DATA	-0.26	1016.10			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.255	13.410	13.590	9.500E-03	88.61	7.698E-03	12.505	14.112	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.275	13.522	13.612	9.520E-03	88.10	7.709E-03	12.536	14.230	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030600  
START TIME: 6:4:0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
MRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.077 AT GMH	MOMENTUM FLUX (Nt/m2) -5.12E-02	FRICTION VELOCITY (Meters/sec) 2.036E-01	GENERAL FORM DN/DZ= (N1-N2)/(Ln(Z1/Z2)+ (Z1+Z2)/2)	GENERAL FORM N SLOPE= (LnZ1-PS1)-(LnZ2-PS1)/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.79	HUMIDITY FLUX (kg/sec m2) 1.81E-05	SCALING SPEC. HUMID (kg/kg) -7.19E-05	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis DMS/DZ= 3.16E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE= 1.96E 00
Z/L AT GMH -0.091	LAT HEAT FLUX (Watts/m2) 4.47E 01	SCALING POT. TEMP. (Kelvin) -1.804E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ= -0.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE= -7.51E 03
Z/L AT 10 METERS -0.070	SKY HEAT FLUX (Watts/m2) 4.59E 00	ROUGHNESS LENGTH (Meters) 1.695E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.24E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE= -3.00E 01
Z/L AT Z2 -0.064	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.69E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.132E-05		N=LTEMP. STRUC. (K-m-2/3) Z=HEIGHT (M) Vert Axis PS1=NONE CT2 SLOPE=NO DATA
MONTIN-ORUKHOV LENGTH (Meters) -1.432E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.24E 01			
PS11 AT Z1= 0.324632 PS11 AT Z2= 0.190755 PS12 AT Z1= 0.210004 PS12 AT Z2= 0.120555	BOWEN RATIO (no units) 0.103			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SM2= +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m3)  
1.2346

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4166E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9045E 05



RUN NUMBER: 7905030600  
 START TIME: 6: 4: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.172	6.68	10.27	NO DATA	1016.09	13.353	-1.181	-1.083	0.156	0.254

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M-2/3)
10.00	12.270	13.509	13.607	9.518E-03	88.16	7.708E-03	12.533	14.216	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.128 AT GMH	MOMENTUM FLUX (Nt/m2) -5.91E-02	FRICTION VELOCITY (Meters/sec) 2.187E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.784E-02	AIR DENSITY (Kg/m3) 1.2348
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.86E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.982E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.864E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT GMH -0.148	LAT.HEAT FLUX (Watts/m2) 4.61E 01	SCALING POT.TEMP. (Kelvin) -3.959E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.658E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9043E 05
Z/L AT 10 METERS -0.114	SEN.HEAT FLUX (Watts/m2) 1.08E 01	ROUGHNESS LENGTH (Meters) 2.323E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.379
MONIN-OBUKHOV LENGTH (Meters) -8.800E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.69E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.071E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.00E 01			BAR.PRES.AT WT LEVEL (Millibar) 1017.29
	BOWEN RATIO (no units) 0.235			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
174%	174%	160%	192%	132%	8%	113%	325%	80%	113%	53%	100%	160%
174%	176%	46%	47%	104%	8%	29%	151%	23%	70%	127%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030600  
 START TIME: 6: 4: 0 PST  
 START DATE: 3 May, 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT TO THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.102 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) 5.73E 02 [6.0E 02]	FRICTION VELOCITY (Meters/sec) 2.153E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.85E 05 [1.8 0E 06]	SCALING SPEC.HUMID. (Kg/Kg) -7.014E-05 [3.0E-05]
Z/L AT GMH 0.119 (0.02)	LAT.HEAT FLUX (Watts/m2) 4.58E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) 2.434E-02 [2.0E-02]
Z/L AT 10 METERS -0.092 (0.02)	SEN.HEAT FLUX (Watts/m2) 8.07E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.134E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.092E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.69E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.071E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.84E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.193 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
25%	24%	8%	2%	39%	0%	15%	36%	4%	2%	48%	6%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030630  
START TIME: 6:34:20 PST  
END TIME: 7: 4:20 PST  
START DATE: 3 May 1977 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.099	5.112	3.488	3.445	5.022	0.364	5.132
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.706	3.928	2.523	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120718	1421 121776	0.183	134	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.93

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.072	6.73	10.13	NO DATA	319.5	1015.25	-5.07E 01	13.356	285.285
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.178	6.48	10.14	NO DATA	-0.35	1016.35			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.252	13.396	13.576	9.425E-03	87.92	7.636E-03	12.406	14.112	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.268	13.503	13.594	9.439E-03	87.38	7.642E-03	12.430	14.226	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030630  
START TIME: 6:34:20 PST  
START DATE: 3 May 1977 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable,-Unstable) -0.084 At GMH	MOMENTUM FLUX (Nt/m2) -3.87E-02	FRICTION VELOCITY (Meter/sec) 1.771E-01	GENERAL FORM: DN/DZ= ((N1-N2))/(Ln(Z1/Z2))* (Z1#Z2)1/2	GENERAL FORM: N SLOPE= ((LnZ1-PS1)-(LnZ2-PS1))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.27	HUMIDITY FLUX (Kg/sec.m2) 1.59E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.253E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= -2.71E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE= 2.26E 00
Z/L AT GMH -0.099	LAT. HEAT FLUX (Watts/m2) 3.97E 01	SCALING POT. TEMP. (Kelvin) -1.466E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE= -7.47E 03
Z/L AT 10 METERS -0.076	SEN. HEAT FLUX (Watts/m2) 3.24E 00	ROUGHNESS LENGTH (Meters) 8.658E-06	N=POT.TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.80E-03	N=POT.TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE= -3.67E 01
Z/L AT Z1 -0.119	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.07E 01	DRAG COEF. AT 10 METERS (Dimensionless) 9.171E 04		N=LnTEMP.STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert Axis PS1=NONE CTP SLOPE=NO DATA
Z/L AT Z2 -0.070	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.25E 00			
MONIN-ORUKHOV LENGTH (Meters) -1.319E 02	BOWEN RATIO (no units) 0.083			
PS11 AT Z1= 0.344456 PS11 AT Z2= 0.203914 PS12 AT Z1= 0.223450 PS12 AT Z2= 0.129217				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR.PRANDTL NUMBER 0.74	PROFILE TUR.SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF.COEF. 0.92E-03	BULK MOISTURE TRANSF.COEF. 1.32E-03
---	--	--	--	--	--

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2348

## \* GENERAL NOTE:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4165E 02  
WATER LAT. HEAT VAP.  
(J/cal./Kg)  
2.9046E 05

RUN NUMBER: 7905030630  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.165	6.51	10.14	NO DATA	1016.25	13.356	-1.191	-1.093	0.135	0.233

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.263	13.490	13.588	9.438E-03	87.44	7.641E-03	12.427	14.212	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.140 AT GMH	MOMENTUM FLUX (Nt/m2) -5.56E-02	FRICTION VELOCITY (Meters/sec) 2.121E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.478E-02	AIR DENSITY (Kg/m3) 1.2351
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.89E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.212E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.889E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMH -0.160	LAT. HEAT FLUX (Watts/m2) 4.67E 01	SCALING POT. TEMP. (Kelvin) -4.031E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.549E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9043E 05
Z/L AT 10 METERS -0.123	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 2.032E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.384
MONIN-OBUKHOV LENGTH (Meters) -9.125E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.07E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.060E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.67E 00			BAR. PRES. AT WT LEVEL (Millibar) 1017.45
	BOWEN RATIO (no units) 0.229			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
201%	201%	182%	206%	156%	6%	87%	362%	91%	115%	65%	111%	182%
176%	176%	46%	46%	104%	6%	23%	150%	23%	69%	127%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030630  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICH. RDSON NUMBER (+=Stable, -=Unstable) -0.114 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -5.22E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.050E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.83E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.227E-05 [3.0E-05]
Z/L AT GMH -0.131 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.53E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.331E-02 [2.0E-02]
Z/L AT 10 METERS -0.101 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.71E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.707E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.895E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.07E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.034E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.58E 00 [3.0E+01]	
	BOWEN RATIO (no units) 0.186 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	23%	16%	10%	49%	0%	29%	43%	10%	0%	58%	11%	8%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030700  
START TIME: 7: 4:30 PST  
END TIME: 7:34:20 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.084	5.095	3.370	3.338	5.030	0.583	5.102
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.716	3.947	2.523	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W51EC	W52EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120473	1411 121526	0.183	139	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.2	59.95

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.047	6.50	10.04	NO DATA	318.5	1015.37	-8.13E 01	13.366	285.260
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.153	6.29	10.05	NO DATA	-0.43	1016.47			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.227	13.367	13.543	9.368E-03	87.51	7.588E-03	12.331	14.090	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.243	13.469	13.560	9.379E-03	86.94	7.591E-03	12.349	14.204	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905030700  
START TIME: 7: 4:30 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
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SAN NICOLAS ISLAND, CAL

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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSTINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.108	MOMENTUM FLUX (Nt/m2) -3.14E-02	FRICTION VELOCITY (Meters/sec) 1.594E-01	GENERAL FORM: $DN/DZ = \frac{1}{(N1-N2)} \cdot \frac{1}{(Z1-Z2)} \cdot \frac{1}{(Z1-Z2)}$	GENERAL FORM: $N \text{ SLOPE} = \frac{1}{(N1-N2)} \cdot \frac{1}{(Z1-Z2)} \cdot \frac{1}{(Z1-Z2)}$
GEOMETRIC MEAN HEIGHT (Meters) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (kg/sec m2) 1.46E-05	SCALING SPEC. HUMID. (kg/Kg) -7.433E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DN/DZ = 2.35E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.51E 00
Z/L AT GMH -0.125	LAT. HEAT FLUX (Watts/m2) 3.67E 01	SCALING POT. TEMP. (Kelvin) -1.453E-02	N-SPEC. HUMIDITY (kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (kg/Kg) Z-HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.27E 03
Z/L AT 10 METERS -0.096	SEN. HEAT FLUX (Watts/m2) 2.89E 00	ROUGHNESS LENGTH (Meters) 4.871E-06	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -1.74E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -3.72E 01
Z/L AT Z1 -0.174	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.13E 01	DRAG COEF. AT 10 METERS (Dimensionless) 0.030E-04		N-LAT. TEMP. STRUCT. (K-M-2/3) Z-HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.088	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.22E 01			
MONIN BRUHUV LENGTH (Meters) -1.040E 02	ROMIN RATIO (no units) 0.080			
PS11 AT Z1 = 0.406452 PS11 AT Z2 = 0.245922 PS12 AT Z1 = 0.265746 PS12 AT Z2 = 0.157115				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2351

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4164E 02  
WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9047E 03

\* CONTINUED ON NEXT PAGE

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.140	6.32	10.04	NO DATA	1016.38	13.366	-1.226	-1.120	0.091	0.189
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.238	13.457	13.555	9.378E-03	87.01	7.591E-03	12.347	14.191	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.157 AT GMM	MOMENTUM FLUX (Nt/m2) -5.16E-02	FRICTION VELOCITY (Meters/sec) 2.043E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.175E-02	AIR DENSITY (Kg/m3) 1.2354
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.97	HUMIDITY FLUX (Kg/sec m2) 1.89E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.482E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.889E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMM -0.179	LAT. HEAT FLUX (Watts/m2) 4.67E 01	SCALING POT. TEMP. (Kelvin) -4.185E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.551E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9045E 05
Z/L AT 10 METERS -0.138	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 1.722E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.396
MONIN-OBUKHOV LENGTH (Meters) -7.264E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.13E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.047E-03		ABS. HUMID. AT WT LEVEL (kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.39E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.58
	BOWEN RATIO (no units) 0.229			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
221%	221%	206%	221%	172%	6%	67%	393%	103%	118%	69%	123%	206%
174%	174%	46%	46%	102%	6%	18%	148%	23%	69%	125%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030700  
 START TIME: 7: 4:30 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.135 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -4.79E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.941E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.82E-05 [9.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.464E-05 [3.0E-05]
Z/L AT GMM -0.155 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.49E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.424E-02 [2.0E-02]
Z/L AT 10 METERS -0.119 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.78E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.401E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -8.378E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.13E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.047E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.78E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.188 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
18%	18%	20%	14%	52%	0%	35%	43%	14%	0%	59%	11%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030730  
START TIME: 7:34:30 PST  
END TIME: 8: 4:40 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.087	5.096	3.000	2.998	5.047	0.845	4.979

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.732	3.945	2.523	0.001	0.001	0.001	0.001	6.295

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WT8FCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120789	1421 121851	0.183	144	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).75V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.95

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel.xM-2/3)
12.079	5.79	10.06	NO DATA	314.3	1015.63	-1.18E 02	13.381	285.292

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.185	5.67	10.05	NO DATA	-0.49	1016.73

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.259	13.396	13.576	9.381E-03	87.43	7.597E-03	12.348	14.123	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.275	13.502	13.593	9.382E-03	86.78	7.593E-03	12.355	14.238	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905030730  
START TIME: 7:34:30 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.196 AT GMH	MOMENTUM FLUX (Nt/m2) -2.21E-02	FRICTION VELOCITY (Meters/sec) 1.339E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)1/(Ln(Z1/Z2)) (Z1*Z2)1/2	GENERAL FORM: 'N' SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.79	HUMIDITY FLUX (Kg/sec m2) 1.31E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.933E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meter) DWS/DZ = 1.79E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.99E 00
Z/L AT GMH -0.220	LAT. HEAT FLUX (Watts/m2) 3.24E 01	SCALING POT. TEMP. (Kelvin) -1.632E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -0.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -6.81E 03
Z/L AT 10 METERS -0.170	SEN HEAT FLUX (Watts/m2) 2.73E 00	ROUGHNESS LENGTH (Meters) 1.604E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.83E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -3.31E 01
Z/L AT Z1 -0.311	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.18E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.41E 04		N=LnTEMP STRUC. (Kel-M-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.156	TOTAL HEAT BUDGET FLUX (Watts/m2) -0.27E 01			
MONIN-OBUKHOV LENGTH (Meters) -5.897E 01	BOWEN RATIO (no units) 0.084			
PS11 AT Z1 = 0.584599 PS11 AT Z2 = 0.373410 PS12 AT Z1 = 0.388506 PS12 AT Z2 = 0.243168				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2353

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2 = +0.028 of Mean Value.  
SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9045E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905030730  
 START TIME: 7:34:30 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U. POT-WT TEMP (Kelvin)
12.172	5.68	10.05	NO DATA	1016.63	13.381	-1.208	-1.110	0.109	0.207

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.270	13.490	13.588	9.382E-03	86.86	7.593E-03	12.355	14.225	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.213 AT 10M	MOMENTUM FLUX (Nt/m2) -4.01E-02	FRICTION VELOCITY (Meters/sec) 1.801E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.244E-02	AIR DENSITY (Kg/m3) 1.2356
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.71E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.666E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.706E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel) 2.4164E-02
Z/L AT 10M -0.238	LAT. HEAT FLUX (Watts/m2) 4.22E-01	SCALING POT. TEMP. (Kelvin) -4.333E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.804E-03	WATER LAT. HEAT VAP (ITcal./Kg) 5.9043E-05
Z/L AT 10 METERS -0.183	SEN. HEAT FLUX (Watts/m2) 9.76E-00	ROUGHNESS LENGTH (Meters) 9.428E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.415
MONIN-OBUKHOV LENGTH (Meters) -5.453E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.18E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.005E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.59E-01			BAR. PRES. AT WT LEVEL (Millibar) 1017.81
	BOWEN RATIO (no units) 0.231			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
249%	249%	252%	252%	201%	6%	54%	453%	126%	126%	75%	146%	252%
175%	175%	46%	46%	103%	6%	13%	149%	23%	69%	176%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030730  
 START TIME: 7:34:30 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.206 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -3.73E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.730E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.65E-05 [1.8E-06]	SCALING SPEC. HUMID. (Kg/Kg) 7.760E-05 [3.0E-05]
Z/L AT 10M -0.231 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.07E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.637E-02 [2.0E-02]
Z/L AT 10 METERS -0.178 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.37E-00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.649E-06 [1.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -5.628E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.18E-02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 9.691E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.93E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.195 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
4%	4%	18%	15%	50%	0%	14%	42%	16%	2%	53%	7%	17%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030800  
START TIME: 8: 4:50 PST  
END TIME: 8:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A	No. 01 TEMP. STRUCT. 1	No. 02 TEMP. STRUCT. 2	No. 03 DEW POINT 1	No. 04 DEW POINT 2	No. 05 WIND SPEED 1	No. 06 WIND SPEED 2	No. 07 BAR. PRES. 2	No. 08 SKY RAD.	No. 09 WIND DIR.
6.205	0.000	0.001	5.000	5.000	2.901	2.870	5.074	1.042	4.962
No. 10 BULK WT. TEMP	No. 11 AC FREQUENCY	No. 12 AC VOLTAGE	No. 13 MANUAL FLAG	No. 14 ZERO REF	No. 15 SPARE A	No. 16 SPARE B	No. 17 VOLT. REF. B		
3.755	3.928	2.526	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD IRRADIATION AND WIND SPEED (ESCARPMENT CORRECTIONS).

No. 1 AIR TEMP. 1	No. 2 AIR TEMP. 2	UPWIND NEAR HEIGHT/LENGTH	UPWIND LAND PATH (Meters)	DPTICAL (Volts)	DPTICAL (Volts)	WTFICAL (Volts)	WS1EC (Coeff.)	WS2EC (Coeff.)
1411 121229	1421 122373	0.183	148	0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS.

MANUAL FLAG (No. scans)	ERROR COUNT (No. scans)	DATA BASE (No. scans)	VOLT. REF. 1 (V)	VOLT. REF. 2 (V)	ZERO REF. DEV. (No. 002V)	AC VOLT. FLUX (No. 15V)	AC FREQ. FLUX (No. 11Hz)	AC VOLTAGE (VAC)	AC FREQUENCY (Hz)
0	0	180	0	0	0	0	0	115.3	59.93

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius)	WIND SPEED 1 (Meter/sec)	DEW POINT 1 (Celsius)	TEMP. STRUCT. 1 (Kelvin-2/3)	WIND DIR. (Deg. True)	BAR. PRES. 1 (Millibar)	SKY RAD. (Watt/m2)	BULK WT. TEMP (Celsius)	MEAN AIR TEMP (Kelvin)
12.123	5.60	10.02	NO DATA	313.7	1016.04	-1.45E-02	13.403	285.340
AIR TEMP. 2 (Celsius)	WIND SPEED 2 (Meter/sec)	DEW POINT 2 (Celsius)	TEMP. STRUCT. 2 (Kelvin-2/3)	TIDE TABLE (Meter MSL)	BAR. PRES. 2 (Millibar)			
12.237	5.45	10.05	NO DATA	-0.55	1017.14			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters)	POT. TEMP. 1 (Celsius)	VIR. TEMP. 1 (Celsius)	V. POT. TEMP. 1 (Celsius)	ARS. HUMID. 1 (Kg/m3)	REL. HUMID. 1 (Percent)	SPEC. HUMID. 1 (Kg/Kg)	VAP. PRES. 1 (Millibar)	S. VAP. PRES. 1 (Millibar)	REF. INDEX 1 (Kelvin-2/3)
14.35	12.303	13.437	13.617	9.359E-03	86.96	7.570E-03	12.322	14.170	NO DATA
HEIGHT, Z2 (Meters)	POT. TEMP. 2 (Celsius)	VIR. TEMP. 2 (Celsius)	V. POT. TEMP. 2 (Celsius)	ARS. HUMID. 2 (Kg/m3)	REL. HUMID. 2 (Percent)	SPEC. HUMID. 2 (Kg/Kg)	VAP. PRES. 2 (Millibar)	S. VAP. PRES. 2 (Millibar)	REF. INDEX 2 (Kelvin-2/3)
9.70	12.327	13.555	13.645	9.383E-03	86.47	7.592E-03	12.358	14.293	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030800  
START TIME: 8: 4:50 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.312 AT GMM	MOMENTUM FLUX (Nt/m2) -2.49E-02	FRICTION VELOCITY (Meters/sec) 1.419E-01	GENERAL FORM DN/DZ = $\frac{1}{(N1-N2)} \cdot \frac{1}{(Z1-Z2)} \cdot \frac{1}{(Z1+Z2)}$	GENERAL FORM N'SLOPE = $\frac{1}{(LnZ1-PS1) - (LnZ2-PS1)}$ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (kg/sec m2) 1.47E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.381E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.73E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 2.82E-00
Z/L AT GMM -0.344	LAT. HEAT FLUX (Watts/m2) 3.631 01	SCALING POT. TEMP. (Kelvin) -2.583E-02	N=SPEC HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = -6.45E-03
Z/L AT 10 METERS -0.265	SEN. HEAT FLUX (Watts/m2) 4.58E 00	ROUGHNESS LENGTH (Meters) 2.388E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.75E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = -2.09E-01
Z/L AT Z2 -0.244	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 0.0341 04	N=LnTEMP. STRUCT. (K/M 2/3) Z=HEIGHT (M) Vert Axis PS1=NONE ETC. SLOPE AND DATA	
MONIN-OBUKHOF LENGTH (Meters) -3.777E 01	TOTAL HEAT FLUX (Watts/m2) -1.04E 02			
PS11 AT Z1 = 0.754570 PS11 AT Z2 = 0.502427 PS12 AT Z1 = 0.506193 PS12 AT Z2 = 0.331716	ROSEN RATIO (No units) 0.126			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUX. PRANDTL NUMBER	PROFILE TUX. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOT. TURE TRA-SF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (J/Kg K)	WATER LAT. HEAT VAP (J/Kg)
1.2356	2.4164E 02	5.9043E 05



AD-A116 210

NAVAL RESEARCH LAB WASHINGTON DC

F/G 8/2

THE DATA BASE FOR THE MAY 1979 MARINE SURFACE LAYER MICROMETEOR--ETC(U)

MAY 82 T V BLANC

NRL-NR-4713

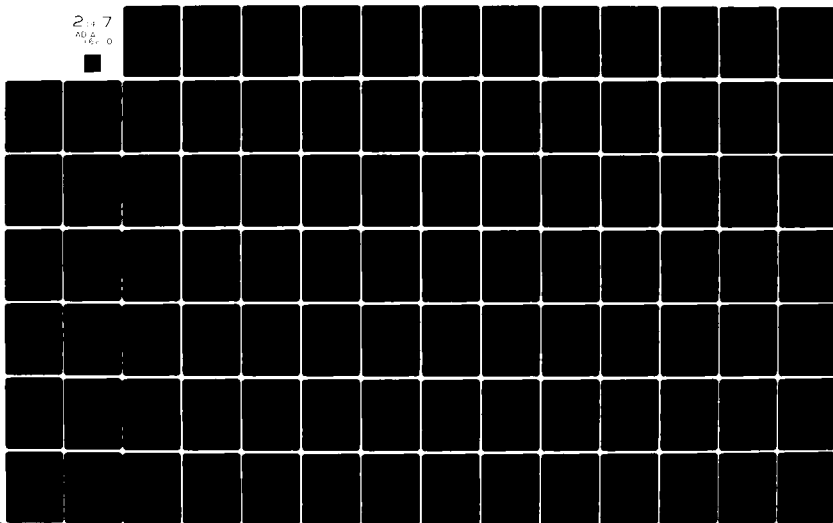
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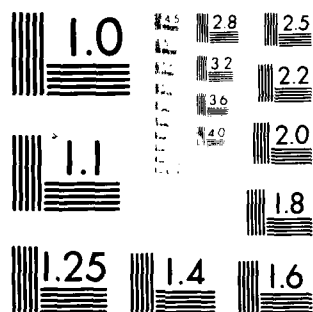
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

RUN NUMBER: 7905030800  
 START TIME: 8: 4:50 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.223	5.46	10.04	NO DATA	1017.04	13.403	-1.189	-1.082	0.137	0.235

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.321	13.540	13.638	9.380E-03	86.53	7.590E-03	12.354	14.278	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.234 AT GMH	MOMENTUM FLUX (Nt/m2) -3.66E-02	FRICTION VELOCITY (Meters/sec) 1.720E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.958E-02	AIR DENSITY (Kg/m3) 1.2358
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.66E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.797E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.657E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.261	LAT. HEAT FLUX (Watts/m2) 4.10E 01	SCALING POT. TEMP. (Kelvin) -4.325E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.439E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9040E 05
Z/L AT 10 METERS -0.201	SEN. HEAT FLUX (Watts/m2) 9.30E 00	ROUGHNESS LENGTH (Meters) 7.424E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.444
MONIN-OBUKHOV LENGTH (Meters) -4.981E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.45E 02	DRAW COEF. AT 10 METERS (Dimensionless) 9.907E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.168E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.51E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.24
	BOWEN RATIO (no units) 0.227			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
231%	231%	262%	262%	195%	5%	52%	457%	131%	131%	64%	151%	262%
176%	176%	46%	45%	104%	5%	11%	150%	23%	68%	127%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030800  
 START TIME: 8: 4:50 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.268 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -3.48E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.675E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.63E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.997E-05 (3.0E-05)
Z/L AT GMH -0.297 (0.02)	LAT. HEAT FLUX (Watts/m2) 4.03E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.166E-02 (2.0E-02)
Z/L AT 10 METERS -0.228 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.66E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.307E-06 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.378E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.45E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 9.751E-04 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.68E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.202 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
15%	14%	12%	7%	32%	0%	6%	28%	11%	4%	29%	5%	6%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905030830  
START TIME: 8:35:10 PST  
END TIME: 9: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.062	5.077	2.651	2.648	5.78	1.779	4.894
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.787	3.914	2.531	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121447	1421 122735	0.183	151	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.91

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.145	5.12	9.91	NO DATA	311.4	1016.11	-2.48E 02	13.435	285.369
AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.274	5.03	9.94	NO DATA	-0.59	1017.21			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.325	13.450	13.629	9.292E-03	86.21	7.523E-03	12.234	14.191	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.364	13.581	13.671	9.313E-03	85.62	7.535E-03	12.267	14.328	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030830  
START TIME: 8:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.594 AT GHM	MOMENTUM FLUX (Nt/m2) -2.72E-02	FRICTION VELOCITY (Meters/sec) 1.485E-01	GENERAL FORM: $DN/DZ = ((N1-N2)/(Ln(Z1/Z2)))^2$	GENERAL FORM: $N' SLOPE = ((LnZ1-PSI1)-(LnZ2-PSI2))/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.66E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.043E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.58E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 2.69E 00
Z/L AT GHM -0.641	LAT. HEAT FLUX (Watts/m2) 4.10E 01	SCALING POT. TEMP. (Kelvin) -4.426E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -5.9HE 03
Z/L AT 10 METERS -0.493	SFN. HEAT FLUX (Watts/m2) 8.22E 00	ROUGHNESS LENGTH (Meters) 3.190E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.37E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.27E 01
Z/L AT Z2 -0.454	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.48E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.274E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -2.027E 01	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.99E 02			
PSI1 AT Z1= 1.034557 PSI1 AT Z2= 0.726860 PSI2 AT Z1= 0.699256 PSI2 AT Z2= 0.487039	BOWEN RATIO (no units) 0.200			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2356

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2= +0.028 of Mean Value.  
SH1-SH2= +/- 0.0RE-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/Kcal./Kg Kel.)  
2.4163E 02

WATER LAT. HEAT VAP.  
(J/Kcal./Kg)  
5.9041E 03

RUN NUMBER: 7905030830  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.258	WIND SPEED (Meter/sec) 5.04	DEW POINT (Celsius) 9.93	TEMP.STRUC. (Kel.xM-2/3) NO DATA	BAR.PRES. (Millibar) 1017.11	BULK WT TEMP (Celsius) 13.435	AIR-WT TEMP (Kelvin) -1.177	POT-WT TEMP (Kelvin) -1.079	VIR-WT TEMP (Kelvin) 0.131	V.POT-WT TEMP (Kelvin) 0.229
HEIGHT (Meters) 10.00	POT.TEMP. (Celsius) 12.356	VIR.TEMP. (Celsius) 13.565	V.POT.TEMP. (Celsius) 13.663	ABS.HUMID. (Kg/m3) 9.310E-03	REL.HUMID. (Percent) 85.69	SPEC.HUMID. (Kg/Kg) 7.534E-03	VAP.PRES. (Millibars) 12.264	S.VAP.PRES. (Millibars) 14.312	REF.INDEX (Kel.xM-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.296 AT GHM	MOMENTUM FLUX (Nt/m2) -3.02E-02	FRICTION VELOCITY (Meters/sec) 1.563E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.442E-02	AIR DENSITY (Kg/m3) 1.2358
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.59E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.232E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.590E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GHM -0.327	LAT.HEAT FLUX (Watts/m2) 3.93E 01	SCALING POT.TEMP. (Kelvin) -4.479E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 6.999E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9038E 05
Z/L AT 10 METERS -0.252	SFN.HEAT FLUX (Watts/m2) 8.75E 00	ROUGHNESS LENGTH (Meters) 4.347E-06		VAP.PRES.AT WT LEVEL (Millibar) 15.477
MONIN-OBUKHOV LENGTH (Meters) -3.972E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.48E 02	DRAG COEF.AT 10 METERS (Dimensionless) 9.625E-04		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.00E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.31
	BOWEN RATIO (no units) 0.223			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
220%	220%	293%	293%	213%	5%	41%	506%	146%	146%	67%	166%	293%
176%	176%	46%	45%	104%	5%	8%	149%	23%	68%	127%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.429 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -2.98E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.552E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.60E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.489E-05 [3.0E-05]
Z/L AT GHM -0.467 [0.02]	LAT.HEAT FLUX (Watts/m2) 3.95E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -4.444E-02 [2.0E-02]
Z/L AT 10 METERS -0.359 [0.02]	SFN.HEAT FLUX (Watts/m2) 8.57E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.109E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.784E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.48E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 9.934E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.00E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.218 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
35%	34%	3%	3%	3%	0%	0%	6%	3%	5%	1%	1%	17%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030900  
START TIME: 9: 5:10 PST  
END TIME: 9:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.061	5.072	2.304	2.302	5.085	2.351	4.859

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.851	3.885	2.535	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HFIGHT/LENGTH		PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122543	1421 123972	0.183		152	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) .005V	B(No.) .005V	(No.) .002V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.254	4.44	9.90	NO DATA	310.2	1016.21	-3.28E 02	13.497	285.486

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.397	4.37	9.91	NO DATA	-0.61	1017.31

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.434	13.559	13.739	9.284E-03	85.54	7.519E-03	12.229	14.296	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.487	13.703	13.793	9.291E-03	84.76	7.520E-03	12.244	14.446	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905030900  
START TIME: 9: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STARTILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -1.073 AT GMH	MOMENTUM FLUX (Nt/m2) -2.68E-02	FRICITION VELOCITY (Meters/sec) 1.473E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] (Z1=Z2)/2	GENERAL FORM: 'N' SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.97	HUMIDITY FLUX (Kg/sec m2) 1.75E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.646E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.37E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.72E 00
Z/L AT GMH -1.143	LAT. HEAT FLUX (Watts/m2) 4.34E 01	SCALING POT. TEMP. (Kelvin) -6.419E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -5.60E 03
Z/L AT 10 METERS -0.880	SFN. HEAT FLUX (Watts/m2) 1.18E 01	ROUGHNESS LENGTH (Meters) 3.028E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -5.93E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.42E 00
Z/L AT Z1 -1.614	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.28E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.714E 05		N=LnTEMP. STRUC. (KxH-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.809	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.73E 02			
MONTIN-ORUKHOV LENGTH (Meters) -1.137E 01	BOWEN RATIO (no units) 0.272			
PS11 AT Z1 = 1.336149 PS11 AT Z2 = 0.980540 PS12 AT Z1 = 0.904294 PS12 AT Z2 = 0.662180				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT	GRAVITATION ACCELERATION	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
(No units) 0.4	(M/sec 2) 9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2352

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2 = +0.028 of Mean Value.  
SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4162E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9034E 05

RUN NUMBER: 7905030900  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP STRUC. (Kel x M <sup>-2/3</sup> )	BAR PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.380	4.38	9.41	NO DATA	1017.21	13.497	-1.117	-1.019	0.189	0.287

HEIGHT (Meters)	POT. TEMP (Celsius)	VIR. TEMP (Celsius)	V. POT. TEMP (Celsius)	ABS. HUMID. (Kg/m <sup>3</sup> )	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel x M <sup>-2/3</sup> )
10.00	12.478	11.885	13.783	9.291E-03	84.85	7.520E-03	12.243	14.429	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.428 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) 2.17E-02	FRICTION VELOCITY (Meters/sec) 1.326E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec <sup>2</sup> ) -1.760E-02	AIR DENSITY (Kg/m <sup>3</sup> ) 1.2354
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.47E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.680E-05	WITH ABS. HUMIDITY (Meter Kg/sec m <sup>3</sup> ) 1.419E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E-02
Z/L AT GMH -0.466	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.51E-01	SCALING POT. TEMP. (Kelvin) 4.599E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.101E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9031E-05
Z/L AT 10 METERS -0.359	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 7.62E-00	ROUGHNESS LENGTH (Meters) 1.501E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.541
MONIN-OBUKHOV LENGTH (Meters) -2.788E-01	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -3.28E-02	DRAG COEF. AT 10 METERS (Dimensionless) 9.188E-04		ABS. HUMID. AT WT LEVEL (Kg/m <sup>3</sup> ) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -2.85E-02			BAR. PRES. AT WT LEVEL (Millibar) 1018.41
	BOWEN RATIO (no units) 0.217			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
215%	215%	344%	344%	259%	5%	40%	604%	172%	172%	87%	192%	344%
179%	179%	46%	44%	107%	5%	7%	151%	23%	67%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030900  
 START TIME: 9: 5:10 P.M.  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.721 [0.02] AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -2.23E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.344E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.46E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 8.937E-05 [3.0E-05]
Z/L AT GMH -0.774 [0.02]	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.60E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -5.689E-02 [2.0E-02]
Z/L AT 10 METERS -0.595 [0.02]	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 8.85E-00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.780E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.680E-01	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -3.28E-02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.002E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -2.83E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.228 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
45%	44%	5%	15%	26%	0%	3%	14%	7%	6%	16%	2%	51%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905030930  
START TIME: 9:35:10 PST  
END TIME: 10:51:00 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.073	No.04 DEW POINT2 5.083	No.05 WIND SPEED1 2.499	No.06 WIND SPEED2 2.488	No.07 BAR.PRES.2 5.098	No.08 SKY RAD. 2.755	No.09 WIND DIR. 5.062
No.10 BULK WT TEMP 3.907	No.11 AC FREQUENCY 3.688	No.12 AC VOLTAGE 2.534	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 123392	No.2 AIR TEMP.2 1421 124722	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 152	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1FC (Coeff.) 0.792	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).5V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.89
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.339	WIND SPEED1 (Meter/sec) 4.82	DEW POINT1 (Celsius) 9.98	TEMP.STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg.True) 317.1	BAR.PRES.1 (Millibar) 1016.41	SKY RAD. (Watt/m2) -3.84E 02	BULK WT TEMP (Celsius) 13.552	MEAN AIR TEMP (Kelvin) 285.566
AIR TEMP.2 (Celsius) 12.472	WIND SPEED2 (Meter/sec) 4.72	DEW POINT2 (Celsius) 9.97	TEMP.STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.61	BAR.PRES.2 (Millibar) 1017.51			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.519	VIR.TEMP.1 (Celsius) 13.651	V.POT.TEMP.1 (Celsius) 13.831	ABS.HUMID.1 (Kg/m3) 9.329E-03	REL.HUMID.1 (Percent) 85.48	SPEC.HUMID.1 (Kg/Kg) 7.556E-03	VAP.PRES.1 (Millibar) 12.291	S.VAP.PRES.1 (Millibar) 14.379	REF.INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.562	VIR.TEMP.2 (Celsius) 13.784	V.POT.TEMP.2 (Celsius) 13.874	ABS.HUMID.2 (Kg/m3) 9.333E-03	REL.HUMID.2 (Percent) 84.72	SPEC.HUMID.2 (Kg/Kg) 7.554E-03	VAP.PRES.2 (Millibar) 12.302	S.VAP.PRES.2 (Millibar) 14.521	REF.INDEX 2 (Kelvin-2/3) NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905030930  
START TIME: 9:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.742 AT GNM	MOMENTUM FLUX (Nt/m2) -2.66E-02	FRICTION VELOCITY (Meters/sec) 1.467E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1/Z2)^(1/2)]	GENERAL FORM: N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEDMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.69E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.273E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.49E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.73E 00
Z/L AT GNM -0.796	LAT.HEAT FLUX (Watts/m2) 4.15E 01	SCALING POT. TEMP. (Kelvin) -5.019E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -5.83E 03
Z/L AT 10 METERS -0.613	SEN.HEAT FLUX (Watts/m2) 9.20E 00	ROUGHNESS LENGTH (Meters) 2.961E-06	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ = -4.83E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.0HE 01
Z/L AT Z1 -1.124	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.84E 02	DRAQ COEF. AT 10 METERS (Dimensionless) 1.304E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.564	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.34E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.632E 01	BOWEN RATIO (no units) 0.222			
PSI1 AT Z1= 1.143179 PSI1 AT Z2= 0.817013 PSI2 AT Z1= 0.773507 PSI2 AT Z2= 0.549431				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR.PRANDTL NUMBER 0.74	PROFILE TUR.SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF.COEF. 0.92E-03	BULK MOISTURE TRANSF.COEF. 1.32E-03
---	--	--	--	--	--

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2351

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4163E 02

WATER LAT.HEAT VAP.  
(ITcal./Kg)  
5.9038E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2 = +0.028 of Mean Value.  
SH1-SH2 = +/- .00E-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905030930  
 START TIME: 9:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3) NO DATA	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.456	4.73	9.97		1017.42	13.552	-1.096	-0.998	0.216	0.314

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3) NO DATA
10.00	12.554	13.768	13.866	9.332E-03	84.81	7.555E-03	12.301	14.504	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP,=-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable,=-Unstable) -0.335 AT GNM	MOMENTUM FLUX (Nt/m2) -2.61E-02	FRICTION VELOCITY (Meters/sec) 1.453E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.112E-02	AIR DENSITY (Kg/m3) 1.2353
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.54E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.534E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.536E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GNM -0.368	LAT.HEAT FLUX (Watts/m2) 3.80E 01	SCALING POT.TEMP. (Kelvin) -4.366E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 6.346E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9827E 05
Z/L AT 10 METERS -0.284	SEN.HEAT FLUX (Watts/m2) 7.93E 00	ROUGHNESS LENGTH (Meters) 2.786E-06		VAP.PRES.AT WT LEVEL (Millibar) 15.600
MONIN-OBUKHOV LENGTH (Meters) -3.526E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.84E 02	DRAG COEF.AT 10 METERS (Dimensionless) 9.425E-04		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.38E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.62
	BOWEN RATIO (no units) 0.209			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
218%	218%	309%	309%	227%	5%	30%	536%	154%	154%	73%	174%	309%
180%	180%	46%	44%	108%	5%	6%	152%	23%	67%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905030930  
 START TIME: 9:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP,=-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable,=-Unstable) -0.319 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -2.62E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.455E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.55E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.772E-05 [3.0E-05]
Z/L AT GNM -0.562 [0.02]	LAT.HEAT FLUX (Watts/m2) 3.84E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -4.786E-02 [2.0E-02]
Z/L AT 10 METERS -0.432 [0.02]	SEN.HEAT FLUX (Watts/m2) 8.34E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.821E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.313E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.84E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 9.932E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.38E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.212 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
39%	38%	1%	6%	8%	0%	1%	3%	1%	4%	7%	0%	28%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905031000  
START TIME: 10: 5:10 PST  
END TIME: 10:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.095	5.103	3.257	3.212	5.188	2.735	5.008
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.951	3.896	2.532	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123920	1421 125191	0.183	151	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.392	6.29	10.11	NO DATA	315.3	1016.57	-3.81E 02	13.595	285.615
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.518	6.06	10.09	NO DATA	-0.59	1017.67			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.572	13.716	13.895	9.412E-03	85.95	7.624E-03	12.403	14.431	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.608	13.841	13.931	9.407E-03	85.14	7.615E-03	12.403	14.567	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031000  
START TIME: 10: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.216 AT GMH	MOMENTUM FLUX (Nt/m2) -4.60E-02	FRICTION VELOCITY (Meters/sec) 1.929E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2))* (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.91E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.022E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.53E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.07E 00
Z/L AT GMH -0.242	LAT. HEAT FLUX (Watts/m2) 4.72E 01	SCALING POT. TEMP. (Kelvin) -3.644E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -6.74E 03
Z/L AT 10 METERS -0.186	SFN. HEAT FLUX (Watts/m2) 8.78E 00	ROUGHNESS LENGTH (Meters) 1.319E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -4.05E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.48E 01
Z/L AT Z1 -0.341	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.81E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.273E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.171	TOTAL HEAT BUDGET FLUX (Watts/.2) -3.25E 02			
MONIN-OBUKHOV LENGTH (Meters) -5.380E 01	BOWEN RATIO (no units) 0.186			
PSI1 AT Z1 = 0.617436 PSI1 AT Z2 = 0.397833 PSI2 AT Z1 = 0.411239 PSI2 AT Z2 = 0.259841				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2350

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00F -3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9827E 05

RUN NUMBER: 7905031000  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.503	6.09	10.09	NO DATA	1017.57	13.595	-1.692	-0.994	0.231	0.329

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.681	13.826	13.924	9.408E-03	85.24	7.616E-03	12.403	14.551	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.159 AT GMM	MOMENTUM FLUX (Nt/m2) -4.72E-02	FRICTION VELOCITY (Meters/sec) 1.955E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.821E-02	AIR DENSITY (Kg/m3) 1.2353
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.94E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.034E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.940E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMM -0.181	LAT.HEAT FLUX (Watts/m2) 4.79E 01	SCALING POT.TEMP. (Kelvin) -3.870E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.566E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.139	SEN.HEAT FLUX (Watts/m2) 9.46E 00	ROUGHNESS LENGTH (Meters) 1.404E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.646
MONIN-OBUKHOV LENGTH (Meters) -7.198E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.81E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.032E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.182E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.24E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.77
	BOWEN RATIO (no units) 0.197			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
174%	174%	191%	215%	137%	5%	24%	351%	95%	119%	41%	115%	191%
180%	180%	46%	45%	108%	5%	7%	153%	23%	68%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031000  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.188 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -4.70E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.950E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.94E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.030E-05 [3.0E-05]
Z/L AT GMM -0.212 [0.02]	LAT.HEAT FLUX (Watts/m2) 4.78E 01 [2.0F+01]	SCALING POT.TEMP. (Kelvin) -3.698E-02 [2.0E-02]
Z/L AT 10 METERS -0.163 [0.02]	SEN.HEAT FLUX (Watts/m2) 9.16E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.381E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -6.142E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.81E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.074E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.24E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.194 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
15%	14%	1%	1%	4%	0%	0%	3%	1%	0%	3%	1%	13%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031030  
START TIME: 10:35:10 PST  
END TIME: 11: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.136	No.04 DEW POINT2 5.144	No.05 WIND SPEED1 3.726	No.06 WIND SPEED2 3.652	No.07 BAR.PRES.2 5.116	No.08 SKY RAD. 3.202	No.09 WIND DIR. 5.109
No.10 BULK WT TEMP 3.997	No.11 AC FREQUENCY 3.886	No.12 AC VOLTAGE 2.531	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 124529	No.2 AIR TEMP.2 1421 125798	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 148	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTRFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.)0.005V 0	VOLT.REF.DEV B(No.)0.005V 0	ZERO REF.DEV (No.)0.002V 0	AC VOLT.FLUX (No.)5V 0	AC FREQ.FLUX (No.)1Hz 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.89
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.453	WIND SPEED1 (Meter/sec) 7.18	DEW POINT1 (Celsius) 10.35	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 318.7	BAR.PRES.1 (Millibar) 1016.69	SKY RAD. (Watt/m2) -4.46E 02	BULK WT TEMP (Celsius) 13.639	MEAN AIR TEMP (Kelvin) 285.676
AIR TEMP.2 (Celsius) 12.580	WIND SPEED2 (Meter/sec) 6.86	DEW POINT2 (Celsius) 10.34	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.56	BAR.PRES.2 (Millibar) 1017.78			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.633	VIR.TEMP.1 (Celsius) 13.798	V.POT.TEMP.1 (Celsius) 13.978	ABS.HUMID.1 (Kg/m3) 9.564E-03	REL.HUMID.1 (Percent) 87.00	SPEC.HUMID.1 (Kg/Kg) 7.748E-03	VAP.PRES.1 (Millibar) 12.606	S.VAP.PRES.1 (Millibar) 14.490	REF.INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.670	VIR.TEMP.2 (Celsius) 13.925	V.POT.TEMP.2 (Celsius) 14.015	ABS.HUMID.2 (Kg/m3) 9.564E-03	REL.HUMID.2 (Percent) 86.22	SPEC.HUMID.2 (Kg/Kg) 7.744E-03	VAP.PRES.2 (Millibar) 12.612	S.VAP.PRES.2 (Millibar) 14.627	REF.INDEX 2 (Kel.xM-2/3) NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031030  
START TIME: 10:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.112 AT GMH	MOMENTUM FLUX (Nt/m2) -7.27E-02	FRICTION VELOCITY (Meters/sec) 2.427E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(\ln(Z1/Z2))^2]$	GENERAL FORM: $N'SLOPE = [(N1-N2)] / [(\ln(Z1-PS1)) - (\ln(Z2-PS1))]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.24E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.461E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.56E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 1.65E 00
Z/L AT GMH -0.129	LAT. HEAT FLUX (Watts/m2) 5.53E 01	SCALING POT. TEMP. (Kelvin) -3.480E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -7.24E 03
Z/L AT 10 METERS -0.100	SEN. HEAT FLUX (Watts/m2) 1.06E 01	ROUGHNESS LENGTH (Meters) 3.577E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.16E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -1.55E 01
Z/L AT Z1 -0.183	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.482E-03		N=LNTMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.092				
MONIN-OBUKHOV LENGTH (Meters) -1.004E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.81E 02			
PS11 AT Z1= 0.416366 PS11 AT Z2= 0.252809 PS12 AT Z1= 0.272530 PS12 AT Z2= 0.161678	BOWEN RATIO (no units) 0.191			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2348

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9824E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031030  
 START TIME: 10:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.565	6.90	10.34	NO DATA	1017.69	13.639	-1.075	-0.977	0.271	0.369

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.663	13.910	14.008	9.564E-03	86.32	7.744E-03	12.612	14.611	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE E. AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.107 AT GMH	MOMENTUM FLUX (Nt/m2) -6.39E-02	FRICTION VELOCITY (Meters/sec) 2.275E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.173E-02	AIR DENSITY (Kg/m3) 1.2350
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.09E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.436E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.089E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMH -0.124	LAT. HEAT FLUX (Watts/m2) 5.16E 01	SCALING POT. TEMP. (Kelvin) -3.606E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.202E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9021E 05
Z/L AT 10 METERS -0.096	SEN. HEAT FLUX (Watts/m2) 1.03E 01	ROUGHNESS LENGTH (Meters) 2.742E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.693
MONIN-OBUKHOV LENGTH (Meters) -1.046E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.086E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.85E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.89
	BOWEN RATIO (no units) 0.199			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
144%	144%	147%	185%	107%	5%	21%	292%	73%	112%	33%	93%	147%
181%	181%	46%	45%	109%	5%	7%	155%	23%	68%	132%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031030  
 START TIME: 10:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.110 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -6.60E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.311E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.12E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.445E-05 [3.0E-05]
Z/L AT GMH -0.127 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.23E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.505E-02 [2.0E-02]
Z/L AT 10 METERS -0.098 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.04E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.005E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.022E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.170E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.84E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.196 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
2%	2%	8%	4%	1%	0%	1%	2%	4%	0%	2%	7%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905031100  
START TIME: 11:51:10 PST  
END TIME: 11:55:00 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.135	5.142	3.950	3.848	5.110	3.270	5.187
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.000	1.002	2.532	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND (AND	DP1FCAL	DP2FCAL	WTF1CAL	WTF2CAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.100917	1421.124249	0.199	103	-0.009	0.000	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 7.005V)	B (No. 7.005V)	(No. 7.005V)	(No. 7.005V)	(No. 7.005V)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.292	7.61	10.34	NO DATA	321.3	1016.61	-4.56E-02	13.662	285.518
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Meter MSL)	(Millibar)			
12.425	7.20	10.33	NO DATA	-0.51	1017.78			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
18.35	12.472	13.636	13.816	9.565E-03	87.89	7.745E-03	12.600	14.336	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
9.20	12.515	13.768	13.858	9.550E-03	87.01	7.735E-03	12.598	14.478	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031100  
START TIME: 11:51:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
STABILITY +0.028 AT 0M	MOMENTUM FLUX (Nt/m2) -1.07E-01	FRICTION VELOCITY (Meters/sec) 2.975E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/(1/Ln(Z1/Z2)) * (Z1+Z2)/2	GENERAL FORM: 'N' SLOPE = 1/(Ln(Z1-PSI1) - (Ln(Z2-PSI1))) / (N1-N2)
0.000000 MEAN HEIGHT (Meters) 0.000000 (Z1+Z2)/2 12.29	HUMIDITY FLUX (Kg/sec m2) 2.65E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.210E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.60E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.34E 00
Z/L AT 0M -0.093	LAT. HEAT FLUX (Watts/m2) 6.55E 01	SCALING POT. TEMP. (Kelvin) -3.923E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.50E 03
Z/L AT 10 METERS -0.071	SEN HEAT FLUX (Watts/m2) 1.46E 01	ROUGHNESS LENGTH (Meters) 7.796E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -4.85E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.3HE 01
Z/L AT Z1 -0.131	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.56E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.75E-03		N=LnTEMP. STRUCT. (xm-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.066	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.76E 02			
MINIMUM OBSERVATION LENGTH (Meters) -1.403E 02	BOWEN RATIO (No. unit) 0.223			
PSI1 AT Z1 = 0.329508 PSI1 AT Z2 = 0.194928 PSI2 AT Z1 = 0.213307 PSI2 AT Z2 = 0.102673				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) <th>GRAVITATION ACCELERATION (M/sec. 2) <th>PROFILE THER. PRANDTL NUMBER <th>PROFILE THER. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec. 2) <th>PROFILE THER. PRANDTL NUMBER <th>PROFILE THER. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PROFILE THER. PRANDTL NUMBER <th>PROFILE THER. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROFILE THER. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SH2 = +/- 0.01E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2354

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9832E 05

RUN NUMBER: 7905031100  
 START TIME: 11: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 MPL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.409	7.25	10.33	NO DATA	1017.61	13.662	-1.253	-1.155	0.090	0.188

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS HUMID. (Kg/m3)	REL HUMID. (Percent)	SPEC HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF INDEX (Kelvin-2/3)
10.00	12.507	13.752	13.050	9.560E-03	87.12	7.737E-03	12.599	14.462	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHL ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.106 AT 10M	MOMENTUM FLUX (Nt/m2) -7.20E-02	FRICTION VELOCITY (Meters/sec) 2.414E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.820E-02	AIR DENSITY (Kg/m3) 1.2356
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.21E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.421E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.214E-05	AIR SPECIFIC HEAT (ITcal/Kg Kel) 2.4167E 02
Z/L AT GMH -0.123	LAT.HEAT FLUX (Watts/m2) 5.47E 01	SCALING POT.TEMP. (Kelvin) -4.020E-02	WITH POT. TEMPERATURE (Meter Kel /sec) 9.705E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9030E 05
Z/L AT 10 METERS -0.095	SEN.HEAT FLUX (Watts/m2) 1.21E 01	ROUGHNESS LENGTH (Meters) 3.500E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.715
MONIN-OBUKHOV LENGTH (Meters) -1.057E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.56E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.109E-03		ABS HUMID.AT WT LEVEL (Kg/m3) 1.187E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.89E 02			BAR.PRES.AT WT LEVEL (Millibar) 018.81
	ROMEN RATIO (no units) 0.222			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "est-".

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH LENGTH	DRAW COEF
119%	119%	118%	168%	86%	5%	21%	254%	59%	109%	27%	79%	118%
173%	173%	46%	45%	101%	5%	7%	147%	23%	68%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031100  
 START TIME: 11: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.089 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -8.25E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.572E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.31E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) -7.339E-05 (3.0E-05)
Z/L AT GMH -0.105 (0.02)	LAT.HEAT FLUX (Watts/m2) 5.70E 01 (2.0E+01)	SCALING POT.TEMP. (Kelvin) -3.940E-02 (2.0E-02)
Z/L AT 10 METERS -0.081 (0.02)	SEN.HEAT FLUX (Watts/m2) 1.35E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.015E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.238E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.56E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.37E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.86E 02 (3.0E+01)	
	ROMEN RATIO (no units) 0.222 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "est-".

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH LENGTH	DRAW COEF
16%	15%	25%	11%	9%	0%	2%	0%	12%	1%	1%	37%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031130  
START TIME: 11:35:10 PST  
END TIME: 12: 51: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.122	5.131	3.752	3.696	5.088	5.974	5.134

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.092	3.881	2.512	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1/FAL	DP2/FAL	WTB/FAL	WS1/C	WS2/C
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123650	1421 125170	0.183	141	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	R(No.).005V	(No.).002V	(No.).35V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.365	7.23	10.27	NO DATA	319.6	1016.26	-8.33E-02	13.732	285.601

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.517	6.94	10.26	NO DATA	-0.44	1017.36

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.545	13.703	13.882	9.509E-03	87.01	7.705E-03	12.530	14.401	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.607	13.855	13.945	9.510E-03	86.10	7.701E-03	12.538	14.561	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031130  
START TIME: 11:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (**UP, **DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (**INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (**Stable, **Unstable) -0.227 AT GMH	MOMENTUM FLUX (Nt/m2) -7.64E-02	FRICTION VELOCITY (Meters/sec) 2.487E-01	GENERAL FORM: DN/DZ= (N1-N2)/(Ln(Z1/Z2)) (Z1*Z2)1/2	GENERAL FORM: N SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.49E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.069E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.23E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.61E 00
Z/L AT GMH -0.253	LAT. HEAT FLUX (Watts/m2) 6.12E 01	SCALING POT. TEMP. (Kelvin) -6.285E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -6.70E 03
Z/L AT 10 METERS -0.195	SEN. HEAT FLUX (Watts/m2) 1.45E 01	ROUGHNESS LENGTH (Meters) 3.943E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -6.95F-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -8.60E 00
Z/L AT Z1 -0.158	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.33E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.502E-03		N=LnTEMP.STRUC. (Kel.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.179	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.52E 02			
HOMIN-OBUKHOV LENGTH (Meters) -5.132E 01	BOWEN RATIO (no units) 0.319			
PSI1 AT Z1= 0.634722 PSI1 AT Z2= 0.410793 PSI2 AT Z1= 0.423212 PSI2 AT Z2= 0.260712				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SM2= +/- .001 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2346

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
0.4166E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9028E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905031130  
 START TIME: 11:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT WT TEMP (Kelvin)
12.499	6.98	10.26	NO DATA	1017.26	13.732	-1.234	-1.136	0.104	0.202

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.597	13.836	13.934	9.510E-03	86.21	7.701E-03	12.537	14.542	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.117 AT 10M	MOMENTUM FLUX (Nt/m2) -6.56E-02	FRICTION VELOCITY (Meters/sec) 2.305E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.313E-02	AIR DENSITY (Kg/m3) 1.2348
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.22E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.808E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.220E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT 10M -0.135	LAT. HEAT FLUX (Watts/m2) 5.49E 01	SCALING POT. TEMP. (Kelvin) -4.031E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.292E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9025E 05
Z/L AT 10 METERS -0.104	SEN. HEAT FLUX (Watts/m2) 1.16E 01	ROUGHNESS LENGTH (Meters) 2.898E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.782
MONIN-OBUKHOV LENGTH (Meters) -9.609E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.33E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.091E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.192E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.67E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.46
	BOWEN RATIO (no units) 0.212			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
150%	150%	171%	202%	115%	5%	15%	318%	85%	117%	30%	105%	171%
174%	174%	46%	45%	102%	5%	6%	147%	23%	68%	125%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031130  
 START TIME: 11:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( )::

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.176 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -6.79E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.344E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.27E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.899E-05 (3.0E-05)
Z/L AT 10M -0.199 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.60E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -5.851E-02 (2.0E-02)
Z/L AT 10 METERS -0.153 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.53E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.201E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.542E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.33E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.174E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.63E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.245 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
31%	30%	9%	7%	26%	0%	1%	23%	4%	2%	23%	9%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031200  
START TIME: 12: 5:10 PST  
END TIME: 12:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.139	5.145	3.714	3.666	5.078	6.108	5.069
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.203	3.858	2.532	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124553	1421 126160	0.183	135	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel. xM-2/3)
12.455	7.16	10.37	NO DATA	317.3	1016.11	-8.52E 02	13.840	285.696
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.616	6.89	10.34	NO DATA	-0.37	1017.20			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
10.35	12.635	13.802	13.982	9.570E-03	87.09	7.757E-03	12.614	14.484	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.706	13.962	14.052	9.560E-03	86.04	7.745E-03	12.608	14.654	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031200  
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START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.300 AT GMM	MOMENTUM FLUX (Nt/m2) -7.34E-02	FRICTION VELOCITY (Meters/sec) 2.439E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1+Z2)/2	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.51E-05	SCALING SPEC. HUMID. (Kg/m3) -8.340E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.00E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.64E 00
Z/L AT GMM -0.331	LAT. HEAT FLUX (Watts/m2) 6.20E 01	SCALING POT. TEMP. (Kelvin) -7.411E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -6.48E 03
Z/L AT 10 METERS -0.254	SEN. HEAT FLUX (Watts/m2) 2.26E 01	ROUGHNESS LENGTH (Meters) 3.645E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -7.92E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -7.29E 00
Z/L AT Z1 -0.467	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.32E 02			
Z/L AT Z2 -0.234				
MONIN-OBUKHOV LENGTH (Meters) -3.931E 01	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.67E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.50E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1 = 0.738240 PSI1 AT Z2 = 0.489794 PSI2 AT Z1 = 0.494920 PSI2 AT Z2 = 0.321008	BOWEN RATIO (no units) 0.364			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2340

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9022E 05

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.597	6.92	10.35	NO DATA	1017.11	13.840	-1.243	-1.145	0.103	0.201

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.695	13.943	14.041	9.561E-03	86.16	7.747E-03	12.609	14.634	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.121 AT GMM	MOMENTUM FLUX (Nt/m2) -6.43E-02	FRICTION VELOCITY (Meters/sec) 2.283E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.211E-02	AIR DENSITY (Kg/m3) 1.2342
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.23E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.902E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.226E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -0.139	LAT.HEAT FLUX (Watts/m2) 5.50E 01	SCALING POT.TEMP. (Kelvin) -4.071E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 9.294E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -0.107	SEN.HEAT FLUX (Watts/m2) 1.16E 01	ROUGHNESS LENGTH (Meters) 2.783E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.890
MONIN-OBUKHOV LENGTH (Meters) -9.334E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.52E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.087E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.200E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.85E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.31
	BOWEN RATIO (no units) 0.211			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
157%	157%	188%	215%	126%	5%	15%	341%	94%	121%	32%	114%	188%
174%	174%	46%	44%	102%	5%	6%	146%	23%	67%	125%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.215 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -6.61E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.313E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.27E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.059E-05 [3.0E-05]
Z/L AT GMM -0.240 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.62E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -6.727E-02 [2.0E-02]
Z/L AT 10 METERS -0.184 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.65E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.019E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -5.422E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.52E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.161E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.80E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.257 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
42%	40%	8%	7%	33%	8%	1%	32%	4%	3%	29%	8%	22%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031230  
START TIME: 12:35:10 PST  
END TIME: 13: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
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## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.133	5.138	3.707	3.637	5.075	5.078	5.132

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE H	VOLT. REF. B
4.198	3.900	2.532	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WB1FCAL	WB2FCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124389	1421 125911	0.183	130	-0.009	0.000	0.000	0.000	0.992	0.950

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.2	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.439	7.15	10.33	NO DATA	319.5	1016.07	-7.08E 02	13.835	285.675

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.591	6.84	10.30	NO DATA	-0.29	1017.17

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.619	13.783	13.962	9.546E-03	86.96	7.738E-03	12.582	14.468	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.681	13.933	14.023	9.534E-03	85.94	7.724E-03	12.573	14.629	NO DATA

## \* CONTINUED BELOW

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## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.200 AT 10M	MOMENTUM FLUX (Nt/m2) -8.28E-02	FRICTION VELOCITY (Meters/sec) 2.590E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1+Z2)/2	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.54E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.954E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.44E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.54E 00
Z/L AT 10M -0.225	LAT. HEAT FLUX (Watts/m2) 6.70E 01	SCALING POT. TEMP. (Kelvin) -6.218E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -6.80E 03
Z/L AT 10 METERS -0.173	SEN. HEAT FLUX (Watts/m2) 2.01E 01	ROUGHNESS LENGTH (Meters) 4.621E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -6.97E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.69E 00
Z/L AT Z1 -0.318	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.08E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.70E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.159	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.25E 02			
MONIN-ORUKHOV LENGTH (Meters) -5.772E 01				
PSI1 AT Z1 = 0.592145 PSI1 AT Z2 = 0.378999 PSI2 AT Z1 = 0.393729 PSI2 AT Z2 = 0.246973	BOWEN RATIO (no units) 0.320			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.37E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2341

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .081-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg. Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9024E 05

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 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.573	6.88	10.31	NO DATA	1017.07	13.835	-1.263	-1.165	0.080	0.178

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.671	13.915	14.013	9.536E-03	86.06	7.726E-03	12.574	14.610	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.125 AT GMH	MOMENTUM FLUX (Nt/m2) -6.32E-02	FRICTION VELOCITY (Meters/sec) 2.263E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.123E-02	AIR DENSITY (Kg/m3) 1.2343
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.23E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.985E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.231E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMH -0.144	LAT. HEAT FLUX (Watts/m2) 5.51E 01	SCALING POT. TEMP. (Kelvin) -4.138E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.367E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9820E 03
Z/L AT 10 METERS -0.111	SFN. HEAT FLUX (Watts/m2) 1.17E 01	ROUGHNESS LENGTH (Meters) 2.686E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.885
MONIN-OBUKHOV LENGTH (Meters) -9.028E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.08E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.084E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.199E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.41E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.27
	BOWEN RATIO (no units) 0.212			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
140%	140%	156%	193%	106%	5%	16%	27%	78%	115%	28%	98%	156%
173%	173%	46%	44%	101%	5%	6%	145%	23%	67%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031230  
 START TIME: 12:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.167 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -6.77E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.338E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.29E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.973E-05 (3.0E-05)
Z/L AT GMH -0.189 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.66E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -5.839E-02 (2.0E-02)
Z/L AT 10 METERS -0.145 (0.02)	SFN. HEAT FLUX (Watts/m2) 1.58E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.276E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.880E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.08E 02 (2.0E+01)	DRAG COEFF. AT 10 METERS (Meters) 1.211E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.37E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.247 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
23%	22%	16%	8%	27%	0%	1%	23%	8%	0%	21%	17%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031300  
START TIME: 13: 5:10 PST  
END TIME: 13:35: 0 PST  
START DATE: 3 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.089	5.094	3.208	3.155	5.068	3.706	5.270
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.174	3.888	2.531	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124844	1421 126146	0.199	88	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. .005V)	(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	188	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.484	6.19	10.07	NO DATA	324.2	1015.95	-5.17E 02	13.802	285.710
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.615	5.93	10.04	NO DATA	-0.20	1017.05			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.664	13.805	13.984	9.375E-03	85.18	7.601E-03	12.359	14.510	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.705	13.933	14.023	9.364E-03	84.30	7.587E-03	12.350	14.650	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031300  
START TIME: 13: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.188 AT GHM	MOMENTUM FLUX (Nt/m2) -5.59E-02	FRICTION VELOCITY (Meters/sec) 2.128E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$	GENERAL FORM: $'N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.07E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.896E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.86E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.88E 00
Z/L AT GHM -0.212	LAT. HEAT FLUX (Watts/m2) 5.12E 01	SCALING POT. TEMP. (Kelvin) -3.999E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -6.85E 03
Z/L AT 10 METERS -0.163	SEN. HEAT FLUX (Watts/m2) 1.06E 01	ROUGHNESS LENGTH (Meters) 2.062E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.52E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.35E 01
Z/L AT Z1 -0.299	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.17E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.604E 03		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.150	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.55E 02			
MONIN-BURKHOF LENGTH (Meters) -6.135E 01	BOWEN RATIO (no units) 0.207			
PSI1 AT Z1= 0.578767 PSI1 AT Z2= 0.363202 PSI2 AT Z1= 0.378935 PSI2 AT Z2= 0.236203				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2339

AIR SPECIFIC HEAT  
(J/Kel. /Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(J/Kel. /Kg)  
5.9022E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031300  
 START TIME: 13: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.599	5.97	10.04	NO DATA	1016.95	13.802	-1.204	-1.106	0.115	0.213

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.697	13.917	14.015	9.366E-03	84.40	7.589E-03	12.351	14.634	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.183 AT GMM	MOMENTUM FLUX (Nt/m2) -4.50E-02	FRICTION VELOCITY (Meters/sec) 1.909E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.643E-02	AIR DENSITY (Kg/m3) 1.2341
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.05E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.699E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.049E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMM -0.207	LAT. HEAT FLUX (Watts/m2) 5.06E 01	SCALING POT. TEMP. (Kelvin) -4.227E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.067E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -0.159	SEN. HEAT FLUX (Watts/m2) 1.01E 01	ROUGHNESS LENGTH (Meters) 1.254E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.849
MONIN-OBUKHOV LENGTH (Meters) -6.286E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.17E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.024E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.197E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.56E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.15
	BOWEN RATIO (no units) 0.199			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
152%	152%	163%	197%	117%	5%	18%	314%	82%	116%	35%	102%	163%
175%	175%	46%	43%	103%	5%	6%	147%	23%	66%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031300  
 START TIME: 13: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.186 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -4.74E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.957E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.05E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.406E-05 (3.0E-05)
Z/L AT GMM -0.209 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.07E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -4.049E-02 (2.0E-02)
Z/L AT 10 METERS -0.161 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.03E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.494E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.204E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.17E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.134E 03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.56E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.202 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
1%	1%	10%	1%	3%	0%	0%	2%	6%	5%	3%	7%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031330  
START TIME: 13:35:10 PST  
END TIME: 14: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DFW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.057	5.065	3.316	3.251	5.061	2.899	5.215
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.138	3.885	2.531	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
ATR TEMP. 1	ATR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125591	1421 126832	0.199	84	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DFW	VOLT. REF. DFW	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) .005V	B(No.) .005V	(No.) .003V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MAN ATR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.559	6.40	9.88	NO DATA	322.3	1015.86	-4.04E 02	13.776	265.701
ATR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)			
12.683	6.11	9.87	NO DATA	-0.12	1016.95			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	12.739	13.863	14.043	9.258E-03	83.73	7.508E-03	12.208	14.580	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	12.773	13.987	14.077	9.255E-03	82.97	7.501E-03	12.209	14.715	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031330  
START TIME: 13:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.128 AT GMH	MOMENTUM FLUX (Nt/m2) -6.12E-02	FRICTION VELOCITY (Meters/sec) 2.228E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1*Z2)1/2]	GENERAL FORM: 'M' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.08E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.565E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.20E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.80E 00
Z/L AT GMH -0.147	LAT. HEAT FLUX (Watts/m2) 5.14E 01	SCALING POT. TEMP. (Kelvin) -3.257E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.15E 03
Z/L AT 10 METERS -0.113	SEN. HEAT FLUX (Watts/m2) 9.06E 00	ROUGHNESS LENGTH (Meters) 2.514E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.84E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.66E 01
Z/L AT Z1 -0.207	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.04E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.630E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.104	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.44E 02			
MONIN-OBUKHOV LENGTH (Meters) -8.851E 01	BOWEN RATIO (no units) 0.176			
PSI1 AT Z1 = 0.452712 PSI1 AT Z2 = 0.278169 PSI2 AT Z1 = 0.297480 PSI2 AT Z2 = 0.178663				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2335

## \* GENERAL NOTE 1:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SM2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4162E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9018E 05



RUN NUMBER: 7905031330  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.668	6.15	9.87	NO DATA	1016.86	13.776	-1.108	-1.010	0.196	0.294

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.766	13.972	14.070	9.256E-03	83.06	7.502E-03	12.209	14.699	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.156 AT GMH	MOMENTUM FLUX (Nt/m2) -4.83E-02	FRICTION VELOCITY (Meters/sec) 1.978E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.911E-02	AIR DENSITY (Kg/m3) 1.2338
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.18E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.950E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.184E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT GMH -0.178	LAT. HEAT FLUX (Watts/m2) 5.40E 01	SCALING POT. TEMP. (Kelvin) -3.879E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.712E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9015E 05
Z/L AT 10 METERS -0.137	SEN. HEAT FLUX (Watts/m2) 9.62E 00	ROUGHNESS LENGTH (Meters) 1.483E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.821
MONIN-OBUKHOV LENGTH (Meters) -7.317E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.04E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.036E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.195E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.41E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.06
	BOWEN RATIO (no units) 0.178			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
145%	145%	147%	186%	109%	5%	21%	295%	74%	113%	36%	94%	147%
179%	179%	46%	43%	107%	5%	7%	150%	23%	64%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031330  
 START TIME: 13:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.140 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -5.13E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.037E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.16E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.439E-05 [3.0E-05]
Z/L AT GMH -0.161 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.35E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.375E-02 [2.0E-02]
Z/L AT 10 METERS -0.124 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.34E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.808E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -8.092E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.04E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.16E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.41E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.178 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
10%	10%	12%	3%	3%	0%	1%	1%	7%	8%	11%	9%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031400  
START TIME: 14: 5:10 PST  
END TIME: 14:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.057	5.062	3.389	3.342	5.051	2.857	5.075
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.136	3.841	2.530	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2								
AIR TEMP.1	AIR TEMP.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WS1EC	WS2EC	
1411 125331	1421 126534	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)	
		0.183	112	-0.009	0.000	0.000	0.992	0.952	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.533	6.54	9.88	NO DATA	317.6	1015.70	-3.98E 02	13.775	285.753
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)			
12.653	6.30	9.85	NO DATA	-0.04	1016.80			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	12.713	13.837	14.017	9.254E-03	83.84	7.506E-03	12.202	14.553	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	12.744	13.955	14.045	9.243E-03	83.03	7.491E-03	12.191	14.684	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031400  
START TIME: 14: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.163 AT GMH	MOMENTUM FLUX (Nt/m2) -4.63E-02	FRICTION VELOCITY (Meters/sec) 1.938E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2))] (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 1.86E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.770E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.67E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 2.06E 00
Z/L AT GMH -0.185	LAT.HEAT FLUX (Watts/m2) 4.59E 01	SCALING POT. TEMP. (Kelvin) -2.979E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -6.96E 03
Z/L AT 10 METERS -0.142	SEN.HEAT FLUX (Watts/m2) 7.21E 00	ROUGHNESS LENGTH (Meters) 1.349E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.42E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.81E 01
Z/L AT Z1 -0.261	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.173E-03		
Z/L AT Z2 -0.131	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.45E 02			
MONIN-OBUKHOV LENGTH (Meters) -7.018E 01	BOWEN RATIO (no units) 0.157			N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1= 0.525368 PSI1 AT Z2= 0.330046 PSI2 AT Z1= 0.347554 PSI2 AT Z2= 0.213672				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEW HEAT TRANSF.COEF.	BULK MOISTURE TRANSF.COEF.
0.4	9.7959	0.74	0.74	8.92E-03	1.32E-03

## \* GENERAL NOTE4:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2335

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4162E 02

WATER LAT.HEAT VAP.  
(ITcal./Kg)  
5.9019E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031400  
 START TIME: 14: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	%POT-WT TEMP (Kelvin)
12.639	6.35	9.85	NO DATA	1016.70	13.775	-1.136	-1.038	0.166	0.264

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.737	13.941	14.039	9.244E-03	83.12	7.493E-03	12.193	14.669	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD RICHARDSON NUMBER (+=Stable, -=Unstable) -0.146 AT GMM	MOMENTUM FLUX (Nt/m2) -5.17E-02	FRICTION VELOCITY (Meters/sec) 2.048E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.192E-02	AIR DENSITY (Kg/m3) 1.2337
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.25E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.926E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.255E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4162E 02
Z/L AT GMM -0.167	LAT.HEAT FLUX (Watts/m2) 5.57E 01	SCALING POT.TEMP. (Kelvin) -3.928E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.042E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -0.128	SEN.HEAT FLUX (Watts/m2) 1.00E 01	ROUGHNESS LENGTH (Meters) 1.738E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.817
MONIN-OBUKHOV LENGTH (Meters) -7.785E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.048E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.194E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.33E 02			BAR.PRES.AT WT LEVEL (Millibar) 1017.90
	BOWEN RATIO (no units) 0.180			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
176%	176%	184%	209%	135%	5%	22%	344%	92%	117%	43%	112%	184%
178%	178%	46%	43%	106%	5%	7%	149%	23%	66%	129%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031400  
 START TIME: 14: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.155 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -5.06E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.026E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.19E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.510E-05 [3.0E-05]
Z/L AT GMM -0.176 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.40E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.216E-02 [2.0E-02]
Z/L AT 10 METERS -0.136 [0.02]	SEN.HEAT FLUX (Watts/m2) 8.79E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.630E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.379E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.070E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.36E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.173 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
5%	5%	5%	11%	16%	0%	2%	7%	3%	7%	16%	4%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031430  
START TIME: 14:35:10 PST  
END TIME: 15: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT. REF. A 6.205	No.01 TEMP. STRUC. 1 0.001	No.02 TEMP. STRUC. 2 0.001	No.03 DEW POINT 1 4.972	No.04 DEW POINT 2 4.986	No.05 WIND SPEED 1 3.808	No.06 WIND SPEED 2 3.712	No.07 BAR. PRES. 1 5.037	No.08 SKY RAD. 2.625	No.09 WIND DIR. 5.124
No.10 BULK WT TEMP 4.169	No.11 AC FREQUENCY 3.860	No.12 AC VOLTAGE 2.530	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP. 1 1411 125762	No.2 AIR TEMP. 2 1421 126935	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH (Meters) 197	DP1 CAL (Volts) -0.009	DP2 CAL (Volts) 0.000	W1 CAL (Volts) 0.000	W2 CAL (Volts) 0.992	W3 CAL (Volts) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	ZERO REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC FREQ. FLUX (No. scans) 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.86
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 12.576	WIND SPEED 1 (Meter/sec) 7.34	DEW POINT 1 (Celsius) 9.37	TEMP. STRUC. 1 (Celsius) NO DATA	WIND DIR. (Deg. True) 319.2	BAR. PRES. 1 (Millibar) 1015.49	SKY RAD. (Watt/m2) -3.66E-02	BULK WT TEMP (Celsius) 13.887	MEAN AIR TEMP (Kelvin) 285.795
AIR TEMP. 2 (Celsius) 12.693	WIND SPEED 2 (Meter/sec) 6.98	DEW POINT 2 (Celsius) 9.39	TEMP. STRUC. 2 (Celsius) NO DATA	TIDE TABLE (Meter MSL) 0.04	BAR. PRES. 2 (Millibar) 1016.58			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 12.756	VIR. TEMP. 1 (Celsius) 13.837	V. POT. TEMP. 1 (Celsius) 14.016	ARS. HUMID. 1 (Kg/m3) 8.943E-03	REL. HUMID. 1 (Percent) 80.83	SPEC. HUMID. 1 (Kg/Kg) 7.255E-03	VAP. PRES. 1 (Millibar) 11.793	S. VAP. PRES. 1 (Millibar) 14.591	REF. INDEX 1 (Kelvin) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 12.784	VIR. TEMP. 2 (Celsius) 13.956	V. POT. TEMP. 2 (Celsius) 14.046	ARS. HUMID. 2 (Kg/m3) 8.941E-03	REL. HUMID. 2 (Percent) 80.31	SPEC. HUMID. 2 (Kg/Kg) 7.265E-03	VAP. PRES. 2 (Millibar) 11.822	S. VAP. PRES. 2 (Millibar) 14.720	REF. INDEX 2 (Kelvin) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031430  
START TIME: 14:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUBINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.063 AT GMH	MOMENTUM FLUX (Nt/m2) -8.12E-02	FRICTION VELOCITY (Meters/sec) 2.566E-01	GENERAL FORM: $DN/DZ = [ (N1-N2) / (1 + (Z1/Z2)^2) ] * (Z1/Z2)^{1/2}$	GENERAL FORM: $N SLOPE = [ (N1-PS1) - (N2-PS1) ] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMH = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.24E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.077E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = 4.09E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.56E-00
Z/L AT GMH -0.076	LAT. HEAT FLUX (Watts/m2) 5.53E-01	SCALING POT. TEMP. (Kelvin) -2.446E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.64E-03
Z/L AT 10 METERS -0.058	SEN. HEAT FLUX (Watts/m2) 7.83E-00	ROUGHNESS LENGTH (Meters) 4.458E-05	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -3.08E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -2.21E-01
Z/L AT Z1 -0.107	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.66E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.572E-05		N-LNTEMP. STRUC. (Kxm-2/3) Z-HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.054	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.03E-02			
MUNIN-BROKHJUV LENGTH (Meters) -1.717E-02	BOWEN RATIO (no units) 0.141			
PS11 AT Z1 = 0.284072 PS11 AT Z2 = 0.164292 PS12 AT Z1 = 0.182630 PS12 AT Z2 = 0.103241				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2332

AIR SPECIFIC HEAT  
(J/cal /Kg Kel.)  
2.4157E-02

WATER LAT. HEAT VAP  
(J/cal /Kg)  
5.9017E-05

RUN NUMBER: 7905031430  
 START TIME: 14:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.679	7.02	9.39	NO DATA	1016.49	13.807	-1.128	-1.030	0.134	0.232

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.777	13.942	14.040	8.959E-03	80.38	7.264E-03	11.819	14.704	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.106 AT GMM	MOMENTUM FLUX (Nt/m2) -6.64E-02	FRICTION VELOCITY (Meters/sec) 2.321E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.387E-02	AIR DENSITY (Kg/m3) 1.2334
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.79E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.731E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.786E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMM -0.123	LAT. HEAT FLUX (Watts/m2) 6.88E 01	SCALING POT. TEMP. (Kelvin) -3.727E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.651E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9814E 05
Z/L AT 10 METERS -0.095	SEN. HEAT FLUX (Watts/m2) 1.08E 01	ROUGHNESS LENGTH (Meters) 2.981E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.847
MONIN-OBUKHOV LENGTH (Meters) -1.054E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.66E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.093E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.197E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.86E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.69
	BOWEN RATIO (no units) 0.157			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
138%	138%	129%	174%	103%	5%	23%	277%	64%	110%	38%	84%	129%
179%	179%	46%	41%	107%	5%	8%	148%	23%	64%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031430  
 START TIME: 14:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT UNCERTAINTY WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.082 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -7.03E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.386E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.68E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.749E-05 [3.0E-05]
Z/L AT GMM -0.096 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.62E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.740E-02 [2.0E-02]
Z/L AT 10 METERS -0.074 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.28E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.480E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.347E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.66E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.201E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.91E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.151 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
26%	25%	12%	12%	16%	0%	3%	5%	6%	16%	27%	13%	23%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031500  
START TIME: 15: 5:10 PST  
END TIME: 15:35: 0 PST  
START DATE: 3 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PER. D: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.932	4.944	3.633	3.563	5.030	2.300	4.929

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.199	3.854	2.528	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125000	1421 126240	0.103	102	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.500	7.01	9.14	NO DATA	312.6	1015.37	-3.21E 02	13.836	285.722

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.624	6.70	9.14	NO DATA	0.10	1016.47

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.680	13.740	13.920	8.803E-03	79.94	7.140E-03	11.605	14.516	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.714	13.865	13.955	8.812E-03	79.32	7.142E-03	11.621	14.651	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031500  
START TIME: 15: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR.WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.113 AT GHM	MOMENTUM FLUX (Nt/m2) -6.64E-02	FRICTION VELOCITY (Meters/sec) 2.321E-01	GENERAL FORM:DN/DZ= [(N1-N2)]/(Ln(Z1/Z2)) (Z1+Z2)/2	GENERAL FORM:N'SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.14E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.468E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.40E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.72E 00
Z/L AT GHM -0.131	LAT.HEAT FLUX (Watts/m2) 5.28E 01	SCALING POT. TEMP. (Kelvin) -3.203E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -7.24E 03
Z/L AT 10 METERS -0.100	SFN.HEAT FLUX (Watts/m2) 9.27E 00	ROUGHNESS LENGTH (Meters) 2.982E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.82E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -1.69E 01
Z/L AT Z1 -0.104	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.435E-03		N=LnTEMP.STRUC.(Km-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.092	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.59E 02			
MONIN-ORUKHOV LENGTH (Meters) -9.453E 01	BOWEN RATIO (no units) 0.176			
PSI1 AT Z1= 0.418669 PSI1 AT Z2= 0.254404 PSI2 AT Z1= 0.274109 PSI2 AT Z2= 0.162743				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SEN HEAT TRANSF.COEF.	BULK MOISTURE TRANSF.COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 +/- .00F-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2335

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4154E 02

WATER LAT.HEAT VAP.  
(ITcal./Kg)  
5.9021E 05

RUN NUMBER: 7905031500  
 START TIME: 15: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.m-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.609	6.74	9.14	NO DATA	1016.37	13.836	-1.227	-1.129	0.014	0.112

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.m-2/3)
10.00	12.707	13.850	13.948	8.811E-03	79.40	7.142E-03	11.620	14.635	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.129 AT GMH	MOMENTUM FLUX (Nt/m2) -6.02E-02	FRICTION VELOCITY (Meters/sec) 2.209E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.880E-02	AIR DENSITY (Kg/m3) 1.2337
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.82E-05	SCALING SPEC.HUMID. (Kg/Kg) -1.836E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.824E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4154E 02
Z/L AT GMH -0.149	LAT.HEAT FLUX (Watts/m2) 6.98E 01	SCALING POT.TEMP. (Kelvin) -4.074E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 9.000E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9018E 05
Z/L AT 10 METERS -0.114	SEN.HEAT FLUX (Watts/m2) 1.12E 01	ROUGHNESS LENGTH (Meters) 2.424E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.875
MONIN-OBUKHOV LENGTH (Meters) -8.735E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.075E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.199E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.40E 02			BAR.PRES.AT WT LEVEL (Millibar) 1017.57
	BOWEN RATIO (no units) 0.161			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
149%	149%	150%	187%	111%	5%	26%	298%	75%	112%	36%	95%	150%
174%	174%	46%	41%	102%	5%	9%	143%	23%	64%	125%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905031500  
 START TIME: 15: 5:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.120 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -6.17E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.235E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05 [8.0E-06]	SCALING SPFC.HUMID. (Kg/Kg) -9.316E-05 [3.0E-05]
Z/L AT GMH -0.139 [0.02]	LAT.HEAT FLUX (Watts/m2) 6.68E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.396E-02 [2.0E-02]
Z/L AT 10 METERS -0.107 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.03E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.597E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.352E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.150E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.44E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.166 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
7%	7%	6%	15%	10%	0%	4%	5%	3%	16%	15%	5%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031530  
START TIME: 15:35:10 PST  
END TIME: 16: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.939	4.931	3.468	3.392	5.027	1.750	5.138

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.214	3.830	2.528	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124781	1421 125916	0.183	99	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .05V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.478	6.69	9.18	NO DATA	319.7	1015.33	-2.44E 02	13.851	285.695

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.392	6.39	9.18	NO DATA	0.16	1016.42

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.658	13.722	13.901	8.828E-03	80.29	7.168E-03	11.638	14.495	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.682	13.836	13.926	8.835E-03	79.70	7.161E-03	11.652	14.619	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031530  
START TIME: 15:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.080 AT GMM	MOMENTUM FLUX (Wt/m2) -5.86E-02	FRICTION VELOCITY (Meters/sec) 2.180E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1+Z2)/2$	GENERAL FORM: $N'SLOPE = [1/(LnZ1-PSI1) - 1/(LnZ2-PSI1)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.94E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.228E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.36E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.83E 00
Z/L AT GMM -0.095	LAT. HEAT FLUX (Watts/m2) 4.80E 01	SCALING POT. TEMP. (Kelvin) -2.155E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.48E 03
Z/L AT 10 METERS -0.073	SEN. HEAT FLUX (Watts/m2) 5.86E 00	ROUGHNESS LENGTH (Meters) 2.292E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.66E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.51E 01
Z/L AT Z1 -0.134	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.44E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.408E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.067	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.90E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.367E 02	BOWEN RATIO (no units) 0.122			
PSI1 AT Z1 = 0.335675 PSI1 AT Z2 = 0.198068 PSI2 AT Z1 = 0.217489 PSI2 AT Z2 = 0.125365				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

$SH1-SH2 = +/- .08E-3$  Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2335
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9022E 05



RUN NUMBER: 7905031530  
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MARINE SURFACE LAYER  
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PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	UIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.578	6.43	9.18	NO DATA	1016.33	13.851	-1.273	-1.175	-0.029	0.069

HEIGHT (Meters)	POT. TEMP. (Celsius)	UIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.676	13.822	13.920	8.835E-03	79.77	7.161E-03	11.650	14.605	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEM ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.154 AT GMM	MOMENTUM FLUX (Nt/m2) -5.37E-02	FRICTION VELOCITY (Meters/sec) 2.086E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.351E-02	AIR DENSITY (Kg/m3) 1.2338
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.68E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.042E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.681E-05	AIR SPECIFIC HEAT (JCal./Kg Kel.) 2.4157E-02
Z/L AT GMM -0.176	LAT. HEAT FLUX (Watts/m2) 6.63E-01	SCALING POT. TEMP. (Kelvin) -4.290E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.948E-03	WATER LAT. HEAT VAP. (JCal./Kg) 5.9020E-05
Z/L AT 10 METERS -0.135	SEN. HEAT FLUX (Watts/m2) 1.12E-01	ROUGHNESS LENGTH (Meters) 1.889E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.890
MONIN-OBUKHOV LENGTH (Meters) -7.397E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.44E-02	DRAW. COEF. AT 10 METERS (Dimensionless) 1.054E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.200E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.67E-02			BAR. PRES. AT WT LEVEL (Millibar) 1017.53
	BOWEN RATIO (no units) 0.169			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
155%	155%	144%	184%	117%	5%	30%	301%	72%	111%	45%	92%	144%
173%	173%	46%	41%	101%	5%	10%	141%	23%	64%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031530  
 START TIME: 15:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.115 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -5.49E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.109E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.55E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.259E-05 [3.0E-05]
Z/L AT GMM -0.133 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.30E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.725E-02 [2.0E-02]
Z/L AT 10 METERS -0.103 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.72E-02 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.017E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.755E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.44E-02 [2.0E+01]	DRAW. COEF. AT 10 METERS (Meters) 1.131E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.72E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.154 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
32%	30%	5%	17%	31%	0%	8%	16%	3%	18%	43%	4%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031600  
START TIME: 16: 5:10 PST  
END TIME: 16:35: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.909	4.915	3.190	3.135	5.026	1.420	5.025

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.202	3.846	2.527	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	UPWIND	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	UPWIND	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 124669	1421 125780	0.183	96	-0.009	0.000	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) .005V	B(No.) .005V	(No.) .002V	(No.) .5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg. True)	(Millibar)	(Millibar)	(Celsius)	(Kelvin)
12.467	6.16	9.00	NO DATA	315.8	1015.32	-1.98E-02	13.839	285.682

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)
12.578	5.92	8.97	NO DATA	0.19	1016.41

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	12.647	13.675	13.875	8.720E-03	79.36	7.072E-03	11.495	14.484	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	12.668	13.804	13.894	8.710E-03	78.64	7.059E-03	11.486	14.606	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031600  
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MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.115 AT GHM	MOMENTUM FLUX (Nt/m2) -4.10E-02	FRICTION VELOCITY (Meters/sec) 1.824E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2)) + (Z1/Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.68E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.484E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.67E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.19E 00
Z/L AT GHM -0.133	LAT. HEAT FLUX (Watts/m2) 4.16E 01	SCALING POT. TEMP. (Kelvin) -2.009E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.22E 03
Z/L AT 10 METERS -0.102	SEN. HEAT FLUX (Watts/m2) 4.57E 00	ROUGHNESS LENGTH (Meters) 1.003E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.39E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.69E 01
Z/L AT Z1 -0.148	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.98E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.174E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.094	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.52E 02			
MONIN-OBUKHOF LENGTH (Meters) -9.762E 01	ROSEN RATIO (no units) 0.110			
PSI1 AT Z1 = 0.424181 PSI1 AT Z2 = 0.258227 PSI2 AT Z1 = 0.277888 PSI2 AT Z2 = 0.165298				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2336
AIR SPECIFIC HEAT (J/cal./kg Kel.) 2.4153E 02
WATER LAT. HEAT VAP. (J/cal./kg) 5.9023E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00F-3 Kg/Kg.

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.565	5.95	8.97	NO DATA	1016.32	13.839	-1.274	-1.176	-0.048	0.050

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.663	13.791	13.889	8.712E-03	78.73	7.060E-03	11.487	14.592	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.194 AT 6MH	MOMENTUM FLUX (Nt/m2) -4.46E-02	FRICTION VELOCITY (Meters/sec) 1.901E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.614E-02	AIR DENSITY (Kg/m3) 1.2339
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.57E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.096E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.571E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT 6MH -0.219	LAT. HEAT FLUX (Watts/m2) 6.35E 01	SCALING POT. TEMP. (Kelvin) -4.436E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.433E-03	WATER LAT. HEAT VAP (ITcal./Kg) 5.9821E 05
Z/L AT 10 METERS -0.168	SEN. HEAT FLUX (Watts/m2) 1.05E 01	ROUGHNESS LENGTH (Meters) 1.231E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.877
MONTN-OBUKHOV LENGTH (Meters) -5.942E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.98E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.022E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.199E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.24E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.52
	BOWEN RATIO (no units) 0.166			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
179%	179%	171%	200%	138%	5%	35%	338%	86%	115%	52%	106%	171%
173%	173%	46%	40%	101%	5%	11%	141%	23%	63%	124%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.155 [0.02] AT 6MH	MOMENTUM FLUX (Nt/m2) -4.38E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.845E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.42E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.72E-05 [3.0E-05]
Z/L AT 6MH -0.177 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.99E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.729E-02 [2.0E-02]
Z/L AT 10 METERS -0.136 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.01E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.165E-05 [6.0E-05]
MONTN-OBUKHOV LENGTH (Meters) -7.356E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.98E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.055E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.31E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.149 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
26%	24%	3%	22%	38%	0%	12%	20%	2%	19%	48%	2%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031630  
START TIME: 16:35:10 PST  
END TIME: 17: 5: 0 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
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## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.883	4.898	3.692	3.612	5.023	1.125	4.948

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.157	3.810	2.527	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WSIEC	WSIEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122946	1421 124111	0.183	95	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.295	7.12	8.84	NO DATA	313.2	1015.26	-1.57E-02	13.295	285.513

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
12.411	6.79	8.86	NO DATA	0.21	1016.36

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.474	13.509	13.689	8.636E-03	79.45	6.999E-03	11.377	14.320	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.501	13.628	13.718	8.654E-03	78.95	7.009E-03	11.405	14.446	NO DATA

\* CONTINUED BELOW

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SAN NICOLAS ISLAND, CAL

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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.077 AT GMH	MOMENTUM FLUX (Nt/m2) -6.84E-02	FRICTION VELOCITY (Meters/sec) 2.354E-01	GENERAL FORM: DN/DZ = [(N1-N2)/((Ln(Z1/Z2)* (Z1*Z2))^(1/2)]	GENERAL FORM: N SLOPE = [(Ln(Z1-PSI)-(Ln(Z2-PSI))]/ (LN1-LN2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.09E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.198E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.65E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.70E-00
Z/L AT GMH -0.091	LAT. HEAT FLUX (Watts/m2) 5.17E-01	SCALING POT. TEMP. (Kelvin) -2.419E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.51E-03
Z/L AT 10 METERS -0.070	SEN. HEAT FLUX (Watts/m2) 7.11E-00	ROUGHNESS LENGTH (Meters) 3.159E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.00E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.25E-01
Z/L AT Z1 -0.129	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.57E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.47E-01		N=LnTEMP. STRUC. (K xM 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.064	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.81E-01			
MOIN-OBUKHOV LENGTH (Meters) -1.426E-02	BOWEN RATIO (no units) 0.138			
PSI1 AT Z1 = 0.325578 PSI1 AT Z2 = 0.191380 PSI2 AT Z1 = 0.210644 PSI2 AT Z2 = 0.120965				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2343

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4151E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9033E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031630  
 START TIME: 16:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.397	6.83	8.86	NO DATA	1016.27	13.795	-1.398	-1.300	-0.181	-0.083

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m-2/3)
10.00	12.495	13.614	13.712	8.652E-03	79.01	7.888E-03	11.402	14.431	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.140 AT GMM	MOMENTUM FLUX (Nt/m2) -6.23E-02	FRICTION VELOCITY (Meters/sec) 2.246E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.045E-02	AIR DENSITY (Kg/m3) 1.2346
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.98E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.074E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.978E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4151E-02
Z/L AT GMM -0.160	LAT. HEAT FLUX (Watts/m2) 7.36E-01	SCALING POT. TEMP. (Kelvin) -4.528E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.017E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9030E-05
Z/L AT 10 METERS -0.123	SFN. HEAT FLUX (Watts/m2) 1.27E-01	ROUGHNESS LENGTH (Meters) 2.608E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.831
MONIN-OBUKHOV LENGTH (Meters) -8.120E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.57E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.081E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.195E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.06E-01			BAR. PRES. AT WT LEVEL (Millibar) 1017.47
	BOWEN RATIO (no units) 0.172			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
149%	149%	141%	181%	111%	5%	44%	292%	70%	111%	41%	90%	141%
168%	168%	46%	40%	96%	5%	14%	137%	23%	63%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031630  
 START TIME: 16:35:10 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.106 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -6.38E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.273E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.82E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.455E-05 [3.0E-05]
Z/L AT GMM -0.123 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.96E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.954E-02 [2.0E-02]
Z/L AT 10 METERS -0.095 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.01E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.781E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.053E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.57E-02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.157E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.72E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.161 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
36%	26%	5%	19%	28%	0%	26%	12%	3%	19%	48%	5%	17%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031700  
START TIME: 17: 5:10 PST  
END TIME: 17:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC.1	TEMP. STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.2	SKY RAD.	WIND DIR.
6.204	0.000	0.000	4.900	4.912	3.991	3.893	5.017	1.094	4.961
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.121	3.809	2.540	0.000	0.000	0.000	0.000	6.284		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123435	1421 124580	0.183	95	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP. STRUC.1	WIND DIR.	BAR. PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.344	7.69	8.95	NO DATA	313.7	1015.17	-1.53E 02	13.761	285.561
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP. STRUC.2	TIDE TABLE	BAR. PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.458	7.31	8.95	NO DATA	0.21	1016.27			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.523	13.567	13.747	8.693E-03	79.73	7.047E-03	11.453	14.365	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.548	13.682	13.773	8.703E-03	79.18	7.051E-03	11.472	14.489	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031700  
START TIME: 17: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.051 AT GHM	MOMENTUM FLUX (Nt/m2) -8.58E-02	FRICTION VELOCITY (Meters/sec) 2.637E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/(Ln(Z1/Z2)) (Z1/Z2)^(1/2)	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.26E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.960E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.30E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.52E 00
Z/L AT GHM -0.062	LAT. HEAT FLUX (Watts/m2) 5.60E 01	SCALING POT. TEMP. (Kelvin) -2.160E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.77E 03
Z/L AT 10 METERS -0.048	SFN. HEAT FLUX (Watts/m2) 7.11E 00	ROUGHNESS LENGTH (Meters) 4.952E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.77E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.50E 01
Z/L AT Z1 -0.089	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.53E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.497E-03		N=Ln TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.044	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.96E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.094E 02	BOWEN RATIO (no units) 0.127			
PSI1 AT Z1= 0.244114 PSI1 AT Z2= 0.138861 PSI2 AT Z1= 0.155876 PSI2 AT Z2= 0.886749				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	1.2340
AIR SPECIFIC HEAT (J/Kel. /Kg Kel.)	2.415E 02
WATER LAT. HEAT VAP. (J/Kel. /Kg)	5.9838E 05

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.444	7.35	8.92	NO DATA	1016.17	13.761	-1.316	-1.218	-0.092	0.006

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.542	13.669	13.767	8.702E-03	79.24	7.051E-03	11.470	14.475	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.106 AT GHM	MOMENTUM FLUX (Nt/m2) -7.45E-02	FRICTION VELOCITY (Meters/sec) 2.456E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.032E-02	AIR DENSITY (Kg/m3) 1.2342
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.13E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.033E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.131E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4152E 02
Z/L AT GHM -0.123	LAT. HEAT FLUX (Watts/m2) 7.74E 01	SCAL. IG POT. TEMP. (Kelvin) -4.170E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.024E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E 05
Z/L AT 10 METERS -0.095	SEN. HEAT FLUX (Watts/m2) 1.28E 01	ROUGHNESS LENGTH (Meters) 3.750E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.794
MONIN-OBUKHOV LENGTH (Meters) -1.054E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.53E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.115E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.193E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.25E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.37
	BOWEN RATIO (no units) 0.165			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
141%	141%	127%	173%	105%	5%	45%	278%	64%	109%	41%	84%	127%
171%	171%	46%	40%	99%	5%	14%	139%	23%	63%	122%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031700  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.076 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -7.75E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.504E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.97E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.092E-05 [3.0E-05]
Z/L AT GHM -0.090 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.33E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.670E-02 [2.0E-02]
Z/L AT 10 METERS -0.069 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.00E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.158E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.448E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.53E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.207E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.90E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.152 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
36%	34%	8%	17%	28%	0%	22%	13%	4%	19%	42%	11%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031730  
START TIME: 17:35:20 PST  
END TIME: 18: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.911	4.920	4.069	3.978	5.012	0.821	4.926
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.079	3.810	2.539	0.901	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WTF2CAL	WS1FC	WS2FC
AIR TEMP.1	AIR TEMP.2	HFIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123345	1421 124468	0.183	95	-0.009	0.000	0.000	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZFRD REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.335	7.84	9.01	NO DATA	312.5	1015.10	-1.14E 02	13.719	285.551
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.447	7.46	9.00	NO DATA	0.20	1016.20			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.514	13.563	13.743	8.732E-03	80.14	7.080E-03	11.505	14.356	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.537	13.675	13.765	8.730E-03	79.48	7.073E-03	11.507	14.478	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031730  
START TIME: 17:35:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.048 AT GHM	MOMENTUM FLUX (Nt/m2) -8.15E-02	FRICTION VELOCITY (Meters/sec) 2.570E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1=Z2)/Z2$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.932E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DWS/DZ = 4.22E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.56E 00
Z/L AT GHM -0.059	LAT. HEAT FLUX (Watts/m2) 5.43E 01	SCALING POT. TEMP. (Kelvin) -1.957E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.80E 03
Z/L AT 10 METERS -0.045	SEN. HEAT FLUX (Watts/m2) 6.28E 00	ROUGHNESS LENGTH (Meters) 4.484E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -2.52E-03$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.74E 01
Z/L AT Z1 -0.083	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.14E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.363E-05		N=LnTEMP. STRUC. (Kel.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.042	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.39E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.207E 02	BOWEN RATIO (no units) 0.116			
PSI1 AT Z1= 0.234370 PSI1 AT Z2= 0.132761 PSI2 AT Z1= 0.149389 PSI2 AT Z2= 0.082817				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2339

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4153E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9031E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905031730  
 START TIME: 17:35:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.433	7.51	9.00	NO DATA	1016.10	13.719	-1.286	-1.188	-0.058	0.040

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.531	13.662	13.760	8.731E-03	79.56	7.074E-03	11.507	14.463	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.097 AT GMH	MOMENTUM FLUX (Nt/m2) -7.83E-02	FRICTION VELOCITY (Meters/sec) 2.519E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.347E-02	AIR DENSITY (Kg/m3) 1.2342
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.14E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.009E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.138E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.114	LAT. HEAT FLUX (Watts/m2) 7.76E 01	SCALING POT. TEMP. (Kelvin) -4.052E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.021E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E 05
Z/L AT 10 METERS -0.088	SIN. HEAT FLUX (Watts/m2) 1.27E 01	ROUGHNESS LENGTH (Meters) 4.147E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.751
MONIN-OBUKHOV LENGTH (Meters) -1.142E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.14E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.126E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.42E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.30
	BOWEN RATIO (no units) 0.164			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
149%	149%	133%	176%	111%	6%	55%	287%	66%	110%	45%	86%	133%
172%	172%	46%	41%	100%	6%	17%	141%	23%	64%	123%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031730  
 START TIME: 17:35:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.071 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -7.91E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.532E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.96E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 8.93E-05 (3.0E-05)
Z/L AT GMH -0.084 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.32E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.518E-02 (2.0E-02)
Z/L AT 10 METERS -0.065 (0.02)	SIN. HEAT FLUX (Watts/m2) 9.68E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.259E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.541E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.14E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.161E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.12E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.148 (0.02)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
35%	33%	2%	19%	33%	0%	54%	17%	1%	18%	46%	3%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905031H00  
START TIME: 18: 5:20 PST  
END TIME: 18:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6 Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.924	4.934	4.349	4.247	5.015	0.100	4.845

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. REF. B
4.031	3.006	2.533	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	WIND CAL	WS1 CAL	WS2 CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 121330	1421 122534	0.157	99	-0.009	0.008	0.000	0.557	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.133	8.39	9.09	NO DATA	309.7	1015.15	-2.37E-01	13.673	265.313

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.253	8.01	9.08	NO DATA	0.18	1016.25

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.313	13.367	13.547	8.782E-03	81.62	7.115E-03	11.563	14.167	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.344	13.488	13.578	8.705E-03	80.95	7.113E-03	11.571	14.295	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905031B00  
START TIME: 18: 5:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6 Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.068 AT GMH	MOMENTUM FLUX (Nt/m2) -8.59E-02	FRICTION VELOCITY (Meters/sec) 2.638E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$	GENERAL FORM: $W SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/[N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.32E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.118E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.16E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.52E-00
Z/L AT GMH -0.081	LAT. HEAT FLUX (Watts/m2) 5.73E-01	SCALING POT. TEMP. (Kelvin) -2.733E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.59E-03
Z/L AT 10 METERS -0.062	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.00E-00	ROUGHNESS LENGTH (Meters) 4.959E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.42E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.98E-01
Z/L AT Z1 -0.114	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.26E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.234E-03		N=LNTMP. STRUC. (K/M 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTP SLOPE=NO DATA
Z/L AT Z2 -0.057				
MONIN-OBUKHOV LENGTH (Meters) -1.608E-02				
PSI1 AT Z1 = 0.298180 PSI1 AT Z2 = 0.173424 PSI2 AT Z1 = 0.192128 PSI2 AT Z2 = 0.109199	BOWEN RATIO (no units) 0.157			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

$$SH1-SH2 = +/- 0.08E-3 \text{ Kg/Kg.}$$

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2348

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4154E-02

WATER LAT. HEAT VAP  
(J/cal./Kg)  
5.9042E-05

RUN NUMBER: 7905031800  
 START TIME: 18: 5:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.239	8.06	9.08	NO DATA	1016.15	13.673	-1.434	-1.336	-0.200	-0.102

HEIGHT (Meters)	POT. TEMP (Celsius)	VIR TEMP. (Celsius)	V.POT. TEMP. (Celsius)	AHS HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.337	13.473	13.571	8.785E-03	81.03	7.113E-03	11.571	14.280	NO DATA

BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.087 AT GMM	MOMENTUM FLUX (Nt/m2) -9.32E-02	FRICTION VELOCITY (Meters/sec) 2.747E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.548E-02	AIR DENSITY (Kg/m3) 1.2351
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.28E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.652E-05	WITH AHS. HUMIDITY (Meter Kg/sec m3) 3.275E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4154E 02
Z/L AT GMM -0.107	LAT. HEAT FLUX (Watts/m2) 8.10E 01	SCALING POT. TEMP. (Kelvin) -4.334E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.191E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
Z/L AT 10 METERS -0.079	SEN. HEAT FLUX (Watts/m2) 1.49E 01	ROUGHNESS LENGTH (Meters) 5.792E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.704
MONIN-OBUKHOV LENGTH (Meters) -1.269E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.162E-03		AHS. HUMID. AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.21E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.35
	BOWEN RATIO (no units) 0.184			

MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
149%	149%	144%	183%	109%	8%	117%	291%	72%	110%	37%	92%	144%
167%	167%	46%	41%	95%	8%	30%	136%	23%	64%	118%	43%	40%

CONTINUED BELOW

RUN NUMBER: 7905031800  
 START TIME: 18: 5:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.077 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) 9.14E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.721E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.10E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.723E-05 (3.0E-05)
Z/L AT GMM 0.091 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.66E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.110E-02 (2.0E-02)
Z/L AT 10 METERS -0.070 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.21E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.527E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.428E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.37E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.162E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.60E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.175 (0.08)	

DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
13%	12%	4%	1%	24%	0%	26%	8%	2%	15%	29%	7%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031830  
START TIME: 18:35:20 PST  
END TIME: 19: 5:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.946	4.956	4.649	4.516	5.029	-0.071	4.930
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF. DEV	SPARE A	SPARE B	VOLT. REF. B		
3.984	3.825	2.537	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121689	1421 122801	0.183	99	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.3	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.169	8.95	9.22	NO DATA	312.6	1015.36	9.93E 00	13.626	285.384
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.280	8.45	9.21	NO DATA	0.15	1016.46			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.349	13.414	13.594	8.861E-03	82.15	7.178E-03	11.668	14.204	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.370	13.525	13.616	8.864E-03	81.52	7.176E-03	11.676	14.323	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031830  
START TIME: 18:35:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.026 AT GMH	MOMENTUM FLUX (Nt/m2) -1.29E-01	FRICTION VELOCITY (Meters/sec) 3.233E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1+Z2)/1/2$	GENERAL FORM: $N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.66E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.670E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.63E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.24E 00
Z/L AT GMH -0.033	Lat. HEAT FLUX (Watts/m2) 6.50E 01	SCALING POT. TEMP. (Kelvin) -1.795E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.10E 03
Z/L AT 10 METERS -0.025	GEN. HEAT FLUX (Watts/m2) 7.25E 00	ROUGHNESS LENGTH (Meters) 1.055E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.40E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.01E 01
Z/L AT Z1 -0.046	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.93E 00	DRAW COEF. AT 10 METERS (Dimensionless) 1.81E 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.023	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.30E 01			
MINIM. DRIFT LENGTH (Meters) -3.984E 02	POWER RATIO (no units) 0.110			
PSI1 AT Z1 = 0.144603 PSI1 AT Z2 = 0.078573 PSI2 AT Z1 = 0.090459 PSI2 AT Z2 = 0.048124				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROF. PRANDTL NUMBER	PROF. SCHMIDT NUMBER	BULK SEMI HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E 03	1.32E 03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2349

AIR SPECIFIC HEAT  
(Jtcal./Kg Kel.)  
2.4155E 02

WATER LAT. HEAT VAP.  
(Jtcal./Kg)  
5.9048E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031830  
 START TIME: 18:35:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.267	8.51	9.21	NO DATA	1016.36	13.626	-1.360	-1.262	-0.114	-0.016

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.365	13.512	13.610	8.864E-03	81.59	7.176E-03	11.676	14.309	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.070 AT GMM	MOMENTUM FLUX (Nt/m2) -1.07E-01	FRICTION VELOCITY (Meters/sec) 2.938E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.631E-02	AIR DENSITY (Kg/m3) 1.2351
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.33E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.189E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.334E-05	AIR SPECIFIC HEAT (JCal./Kg Kel.) 2.4155E 02
Z/L AT GMM -0.084	LAT. HEAT FLUX (Watts/m2) 8.24E 01	SCALING POT. TEMP. (Kelvin) -4.044E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.188E-02	WATER LAT. HEAT VAP. (JCal./Kg Kel.) 5.9038E 05
Z/L AT 10 METERS -0.064	SEN. HEAT FLUX (Watts/m2) 1.48E 01	ROUGHNESS LENGTH (Meters) 7.442E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.660
MONIN-OBUKHOV LENGTH (Meters) -1.555E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.93E 00	DRAG COEF. AT 10 METERS (Dimensionless) 1.192E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.07E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.56
	BOWEN RATIO (no units) 0.180			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
134%	134%	112%	164%	101%	12%	130%	265%	56%	108%	45%	76%	112%
170%	170%	46%	41%	98%	12%	35%	139%	23%	64%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031830  
 START TIME: 18:35:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.045 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.13E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.024E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.20E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.246E-05 [3.0E-05]
Z/L AT GMM -0.055 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.91E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.405E-02 [2.0E-02]
Z/L AT 10 METERS -0.042 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.11E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.565E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.359E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.93E 00 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.300E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.02E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.156 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
49%	47%	11%	12%	34%	0%	14%	23%	5%	16%	51%	19%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905031900  
START TIME: 19: 5:20 PST  
END TIME: 19:35:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.000	0.001	4.981	4.989	4.500	4.364	5.053	-0.091	5.045

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.955	3.831	2.531	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP2FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122488	1421 123574	0.103	101	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Millibar)	(Celsius)	(Kelvin)
12.249	8.67	9.43	NO DATA	316.5	1015.72	1.27E 01	13.599	285.463

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.357	8.17	9.41	NO DATA	0.11	1016.82

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.429	13.512	13.692	8.988E-03	82.89	7.282E-03	11.839	14.284	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.448	13.620	13.710	8.983E-03	82.19	7.273E-03	11.837	14.402	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905031900  
START TIME: 19: 5:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
(RAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.023 AT 6M	MOMENTUM FLUX (N1/m2) -1.23E-01	FRICTION VELOCITY (Meters/sec) 3.162E-01	GENERAL FORM: DN/DZ = 1/(N1-N2) / (Ln(Z1/Z2)) (Z1*Z2)^(1/2)	GENERAL FORM: N'SLOPE = 1/(Ln(Z1-PSI1)-(Ln(Z2-PSI1))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.79	HUMIDITY FLUX (Kg/sec m2) 2.59E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.638E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.54E-07	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.27E 00
Z/L AT 6M -0.830	LAT. HEAT FLUX (Watts/m2) 6.41E 01	SCALING POT. TEMP. (Kelvin) -1.569E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.14E 03
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 6.20E 00	ROUGHNESS LENGTH (Meters) 9.737E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.11E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.44E 01
Z/L AT Z1 -0.042	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.64E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.021	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.29E 01			
MONIN-OBUKHOV LENGTH (Meters) -4.383E 02	BOWEN RATIO (no units) 0.097			
PSI1 AT Z1 = 0.133243 PSI1 AT Z2 = 0.071990 PSI2 AT Z1 = 0.083127 PSI2 AT Z2 = 0.044192				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2349

\* GENERAL NOTES:  
Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4157E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9036E 03

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905031900  
 START TIME: 19: 5:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.344	8.23	9.41	NO DATA	1016.73	13.599	-1.254	-1.156	0.008	0.106

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.442	13.607	13.705	8.984E-03	82.28	7.274E-03	11.838	14.386	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.072 AT GNM	MOMENTUM FLUX (Nt/m2) -9.82E-02	FRICTION VELOCITY (Meters/sec) 2.819E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.948E-02	AIR DENSITY (Kg/m3) 1.2352
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.08E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.834E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.076E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4157E 02
Z/L AT GNM -0.086	LAT. HEAT FLUX (Watts/m2) 7.60E 01	SCALING POT. TEMP. (Kelvin) -3.815E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.076E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.9833E 05
Z/L AT 10 METERS -0.086	SEN. HEAT FLUX (Watts/m2) 1.34E 01	ROUGHNESS LENGTH (Meters) 6.384E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.637
MONIN-OBUKHOV LENGTH (Meters) -1.518E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.173E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.182E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.02E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.93
	BOWEN RATIO (no units) 0.177			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
137%	137%	111%	163%	185%	11%	126%	269%	55%	108%	50%	75%	111%
173%	173%	46%	42%	101%	11%	34%	143%	23%	65%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905031900  
 START TIME: 19: 5:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.045 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -1.06E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.920E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.99E-05 [1.8E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.007E-05 [3.0E-05]
Z/L AT GNM -0.054 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.36E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.215E-02 [2.0E-02]
Z/L AT 10 METERS -0.042 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.89E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.603E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.390E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.299E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.81E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.149 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
54%	52%	13%	9%	37%	8%	11%	28%	6%	14%	55%	23%	20%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905032000  
START TIME: 20: 0: 0 PST  
END TIME: 20:29:50 PST  
START DATE: 3 May 1977 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.993	4.999	4.264	4.142	5.086	-0.091	5.116
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.921	3.747	2.527	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121587	1421 122146	0.183	186	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	WIND REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 1) 0.05V	B(No. 2) 0.05V	(No. 3) 0.02V	(No. 1) 5V	(No. 1) Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	110.3	59.75

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.159	8.22	9.50	NO DATA	319.0	1016.73	1.27E 01	13.565	285.373
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Meter MSL)	(Millibar)			
12.267	7.76	9.47	NO DATA	0.05	1017.33			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
18.35	12.339	13.428	13.608	9.039E-03	83.78	7.317E-03	11.902	14.206	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
9.20	12.357	13.534	13.624	9.027E-03	83.02	7.302E-03	11.891	14.323	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905032000  
START TIME: 20: 0: 0 PST  
START DATE: 3 May 1977 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.027 AT GHM	MOMENTUM FLUX (Nt/m2) -1.04E-01	FRICTION VELOCITY (M/sec) 2.906E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[N1-N2]$
GOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec m2) 2.40E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.689E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.04E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.38E 00
Z/L AT GHM -0.034	LAT. HEAT FLUX (Watts/m2) 5.94E 01	SCALING POT. TEMP. (Kelvin) -1.521E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.08E 03
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 5.52E 00	ROUGHNESS LENGTH (Meters) 7.148E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.03E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.55E 01
Z/L AT Z1 -0.049	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.569E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTP SLOPE=NO DATA
Z/L AT Z2 -0.024	TOTAL HEAT RUDGFT FLUX (Watts/m2) 7.76E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.787E 02	BOWEN RATIO (no units) 0.093			
PSI1 AT Z1 = 0.150966 PSI1 AT Z2 = 0.082209 PSI2 AT Z1 = 0.094580 PSI2 AT Z2 = 0.050661				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2359

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.415HE 02  
WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9841E 05



RUN NUMBER: 7905032000  
 START TIME: 20: 0: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NR: MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK W. TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
12.254	7.82	9.47	NO DATA	1017.23	13.565	-1.312	-1.214	-0.044	0.054

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEF. (Kelvin-M-2/3)
10.00	12.352	13.521	13.619	9.029E-03	83.11	7.304E-03	1.09	14.309	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.088 AT 10M	MOMENTUM FLUX (N/m2) -8.66E-02	FRICTION VELOCITY (Meters/sec) 2.647E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.005E-02	AIR DENSITY (Kg/m3) 1.2362
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.86E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.734E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.857E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4158E 02
Z/L AT 10M -0.103	LAT. HEAT FLUX (Watts/m2) 7.06E 01	SCALING POT. TEMP. (Kelvin) -4.054E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.073E-02	WATER LAT. HEAT VAP (ITcal./Kg) 5.9038E 05
Z/L AT 10 METERS -0.079	SEN. HEAT FLUX (Watts/m2) 1.34E 01	ROUGHNESS LENGTH (Meters) 5.024E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.611
MONIN-OBUKHOV LENGTH (Meters) -1.258E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.146E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.67E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.43
	BOWEN RATIO (no units) 0.190			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
143%	143%	116%	166%	110%	11%	128%	277%	58%	108%	52%	78%	116%
171%	171%	46%	42%	99%	11%	34%	142%	23%	65%	122%	45%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032000  
 START TIME: 20: 0: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NR: MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.055 [0.02] AT 10M	MOMENTUM FLUX (N/m2) -9.16E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.720E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.76E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.964E-05 [3.0E-05]
Z/L AT 10M -0.066 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.83E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.281E-02 [2.0E-02]
Z/L AT 10 METERS -0.051 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.68E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.779E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.978E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.255E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.27E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.157 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
55%	53%	11%	10%	41%	0%	12%	32%	5%	13%	60%	18%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905032030  
START TIME: 20:30: 0 PST  
END TIME: 20:59:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.992	4.999	4.152	4.024	5.099	-0.091	5.098
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.909	3.771	2.522	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121219	1421 122344	0.183	109	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF. DEV	VOLT.REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.77

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.122	8.00	9.50	NO DATA	318.3	1016.44	1.27E 01	13.553	285.338
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.234	7.55	9.47	NO DATA	0.01	1017.54			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S.VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.302	13.391	13.570	9.039E-03	83.96	7.315E-03	11.901	14.175	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S.VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.325	13.501	13.592	9.029E-03	83.19	7.301E-03	11.892	14.296	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905032030  
START TIME: 20:30: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.034 AT GMH	MOMENTUM FLUX (Nt/m2) -1.09E-01	FRICTION VELOCITY (Meters/sec) 2.972E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)] * (Z1+Z2)/2$	GENERAL FORM: $'N' SLOPE = [(LnZ1-PSI) - (LnZ2-PSI)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.49E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.774E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.05E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.35E 00
Z/L AT GMH -0.042	LAT. HEAT FLUX (Watts/m2) 6.15E 01	SCALING POT. TEMP. (Kelvin) -1.938E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.98E 03
Z/L AT 10 METERS -0.033	SEN. HEAT FLUX (Watts/m2) 7.20E 00	ROUGHNESS LENGTH (Meters) 7.765E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.55E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.79E 01
Z/L AT Z1 -0.060	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.74E-03		N=LnTEMP.STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.030	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.14E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.067E 02	BOWEN RATIO (no units) 0.117			
PSI1 AT Z1= 0.180201 PSI1 AT Z2= 0.099613 PSI2 AT Z1= 0.113632 PSI2 AT Z2= 0.061617				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2363

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4158E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9043E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905032030  
 START TIME: 20:30: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.221	7.60	9.47	NO DATA	1017.44	13.553	-1.333	-1.235	-0.066	0.032

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.319	13.488	13.586	9.031E-03	83.28	7.303E-03	11.894	14.281	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.097 AT GMH	MOMENTUM FLUX (Nt/m2) -8.07E-02	FRICTION VELOCITY (Meters/sec) 2.557E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.540E-02	AIR DENSITY (Kg/m3) 1.2366
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.760E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.770E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4158E 02
Z/L AT GMH -0.113	LAT. HEAT FLUX (Watts/m2) 6.85E 01	SCALING POT. TEMP. (Kelvin) -4.159E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.063E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9040E 05
Z/L AT 10 METERS -0.087	SFN. HEAT FLUX (Watts/m2) 1.33E 01	ROUGHNESS LENGTH (Meters) 4.398E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.602
MONIN-OBUKHOV LENGTH (Meters) -1.145E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.132E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.45E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.64
	BOWEN RATIO (no units) 0.194			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
131%	131%	112%	164%	99%	11%	124%	263%	56%	108%	43%	76%	112%
170%	170%	46%	42%	98%	11%	34%	141%	23%	65%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032030  
 START TIME: 20:30: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.061 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.91E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.678E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.71E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.010E-05 [3.0E-05]
Z/L AT GMH -0.073 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.70E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.517E-02 [2.0E-02]
Z/L AT 10 METERS -0.056 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.03E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.615E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.773E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.24E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.17E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.167 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
52%	49%	17%	6%	30%	0%	8%	24%	8%	13%	49%	29%	26%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905032100  
START TIME: 21: 0: 0 PST  
END TIME: 21:29:50 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.983	4.995	4.416	4.287	5.107	-0.091	5.053
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.896	3.871	2.521	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2								
AIR TEMP. 1	AIR TEMP. 2		UPWIND NEAR	UPWIND LAND	DP2FCAL	DP2FCAL	WIF2FCAL	WS1EC	WS2EC
1411 119536	1421 120680		HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
			0.183	110	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.954	8.51	9.47	NO DATA	316.8	1016.56	1.27E 01	13.541	285.171
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.068	8.03	9.45	NO DATA	-0.01	1017.65			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.133	13.219	13.399	9.029E-03	84.74	7.301E-03	11.880	14.020	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.158	13.332	13.422	9.021E-03	83.98	7.290E-03	11.875	14.141	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905032100  
START TIME: 21: 0: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.033 AT CMH	MOMENTUM FLUX (Nt/m2) -1.22E-01	FRICITION VELOCITY (Meters/sec) 3.136E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/(Ln(Z1/Z2)* (Z1*Z2)1/2)	GENERAL FORM: N SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.62E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.758E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 5.35E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 SH SLOPE= 1.28E 00
Z/L AT CMH -0.041	LAT. HEAT FLUX (Watts/m2) 6.49E 01	SCALING POT. TEMP. (Kelvin) -2.084E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.00E 03
Z/L AT 10 METERS -0.031	SEN. HEAT FLUX (Watts/m2) 8.18E 00	ROUGHNESS LENGTH (Meters) 9.446E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.75E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.59E 01
Z/L AT Z1 -0.018	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.689E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.029	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.57E 01			
MONIN-BRUKHOV LENGTH (Meters) -3.177E 02	BOWEN RATIO (no units) 0.126			
PSI1 AT Z1= 0.174838 PSI1 AT Z2= 0.096404 PSI2 AT Z1= 0.110123 PSI2 AT Z2= 0.059581				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. SCHMIDT NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2372

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08F -3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4159E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9052E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905032100  
 START TIME: 21: 0: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.054	8.09	9.45	NO DATA	1017.56	13.541	-1.487	-1.389	-0.222	-0.124

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TFMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.152	13.319	13.417	9.023E-03	84.07	7.291E-03	11.876	14.127	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.089 AT GMH	MOMENTUM FLUX (Nt/m2) -9.42E-02	FRICTION VELOCITY (Meters/sec) 2.758E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.609E-02	AIR DENSITY (Kg/m3) 1.2374
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.95E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.633E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.947E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMH -0.105	LAT.HEAT FLUX (Watts/m2) 7.29E 01	SCALING POT.TEMP. (Kelvin) -4.470E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.233E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9050E 05
Z/L AT 10 METERS -0.081	SEN.HEAT FLUX (Watts/m2) 1.54E 01	ROUGHNESS LENGTH (Meters) 5.881E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.591
MONIN-OBUKHOV LENGTH (Meters) -1.239E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.164E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.76
	BOWEN RATIO (no units) 0.212			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
129%	129%	112%	164%	96%	11%	124%	260%	56%	108%	40%	76%	112%
166%	166%	46%	42%	94%	11%	34%	136%	23%	65%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032100  
 START TIME: 21: 0: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.058 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.02E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.868E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.88E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.924E-05 [3.0E-05]
Z/L AT GMH -0.069 [0.02]	LAT.HEAT FLUX (Watts/m2) 7.12E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -2.694E-02 [2.0E-02]
Z/L AT 10 METERS -0.053 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.18E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.169E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.887E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.302E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.77E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.182 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
49%	47%	15%	7%	31%	8%	9%	25%	7%	12%	49%	26%	2.2

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905032130  
START TIME: 21:30: 0 PST  
END TIME: 22: 0:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.978	4.984	4.346	4.239	5.102	-0.091	4.969
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.882	3.870	2.520	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WSIEG	WSPEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118792	1421 119977	0.183	111	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.879	8.37	9.41	NO DATA	313.9	1016.48	1.27E 01	13.528	285.098
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.998	7.94	9.38	NO DATA	-0.03	1017.58			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AES. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.059	13.139	13.319	8.995E-03	84.82	7.272E-03	11.832	13.950	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AES. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.28	12.088	13.256	13.346	8.983E-03	83.99	7.257E-03	11.821	14.075	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905032130  
START TIME: 21:30: 0 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.047 AT GMH	MOMENTUM FLUX (Nt/m2) -1.06E-01	FRICTION VELOCITY (Meters/sec) 2.933E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1=Z2)/2$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.51E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.919E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.83E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.36E 00
Z/L AT GMH -0.058	LAT. HEAT FLUX (Watts/m2) 6.21E 01	SCALING POT. TEMP. (Kelvin) -2.492E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.81E 03
Z/L AT 10 METERS -0.044	SEN. HEAT FLUX (Watts/m2) 9.15E 00	ROUGHNESS LENGTH (Meters) 7.393E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.21E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.17E 01
Z/L AT Z1 -0.091	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.331E-03		N=LTEMP. STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.041	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.39E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.258E 02	BOWEN RATIO (no units) 0.147			
PSI1 AT Z1 = 0.230187 PSI1 AT Z2 = 0.130155 PSI2 AT Z1 = 0.146609 PSI2 AT Z2 = 0.081139				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	1.2374
AIR SPECIFIC HEAT (J/cal./Kg Kell.)	2.4157E 02
WATER LAT. HEAT VAP. (J/cal./Kg)	5.9056E 05

RUN NUMBER: 7905032130  
 START TIME: 21:30: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.983	7.99	9.38	NO DATA	1017.48	13.528	-1.544	-1.446	-0.286	-0.188

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.30	12.081	13.242	13.340	8.984E-03	84.09	7.259E-03	11.823	14.860	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+-Stable, --Unstable) -0.096 AT 10M	MOMENTUM FLUX (Nt/m2) -9.15E-02	FRICTION VELOCITY (Meters/sec) 2.720E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.396E-02	AIR DENSITY (Kg/m3) 1.2377
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.94E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.742E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.942E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4157E-02
Z/L AT 10M -0.112	LAT. HEAT FLUX (Watts/m2) 7.28E-01	SCALING POT. TEMP. (Kelvin) -4.646E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.264E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9854E-05
Z/L AT 10 METERS -0.086	SEN. HEAT FLUX (Watts/m2) 1.58E-01	ROUGHNESS LENGTH (Meters) 5.573E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.577
MONIN-OBUKHOV LENGTH (Meters) -1.158E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.158E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E-02			BAR. PRES. AT WT LEVEL (Millibar) 1018.68
	BOWEN RATIO (no units) 0.217			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
133%	133%	123%	170%	98%	11%	126%	268%	61%	109%	36%	81%	123%
165%	165%	46%	42%	93%	11%	34%	135%	23%	65%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032130  
 START TIME: 21:30: 0 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+-Stable, --Unstable) -0.069 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -9.56E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.778E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.84E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.057E-05 [3.0E-05]
Z/L AT 10M -0.082 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.06E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.008E-02 [2.0E-02]
Z/L AT 10 METERS -0.063 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.26E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.203E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.585E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.24E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.74E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.194 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
36%	33%	9%	9%	27%	0%	10%	19%	4%	17%	40%	15%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905032200  
START TIME: 22: 0:20 PST  
END TIME: 22:30:10 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.285	0.001	0.001	4.985	4.990	4.355	4.224	5.101	-0.091	5.077
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.873	3.869	2.519	0.001	0.001	0.001	0.001	6.245		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	WIND CAL	WIND 1	WIND 2
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118816	1421 119966	0.183	112	-0.009	0.000	0.000	5.942	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .15V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	WIND AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin-2/3)
11.882	8.39	9.45	NO DATA	317.6	1016.47	1.27E-01	12.519	105.049
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.997	7.91	9.42	NO DATA	-0.03	1017.57			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.061	13.146	13.325	9.021E-03	85.06	7.294E-03	11.867	13.952	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.087	13.258	13.348	9.307E-03	84.22	7.277E-03	11.854	14.074	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905032200  
START TIME: 22: 0:20 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.034 AT GMH	MOMENTUM FLUX (M1/M2) -1.21E-01	FRICTION VELOCITY (Meters/sec) 3.122E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]^*$ (Z1*Z2)^(1/2)	GENERAL FORM: $N' SLOPE = [Ln(Z1-PS1) - Ln(Z2-PS1)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.62E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.776E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.30E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.28E 00
Z/L AT GMH -0.043	LAT. HEAT FLUX (Watts/m2) 6.47E 01	SCALING POT. TEMP. (Kelvin) -2.146E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.98E 03
Z/L AT 10 METERS -0.033	SEN. HEAT FLUX (Watts/m2) 8.39E 00	ROUGHNESS LENGTH (Meters) 9.295E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.82E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -2.54E 01
Z/L AT Z1 -0.060	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.72E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.030	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.58E 01			
MONIN-BRUKHOV LENGTH (Meters) -3.047E 02	ROWEN RATIO (no unit) 0.130			
PS11 AT Z1 = 0.180930 PS11 AT Z2 = 0.180050 PS12 AT Z1 = 0.114109 PS12 AT Z2 = 0.061895				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by inversion of:

SM1-SH2 = +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2374

AIR SPECIFIC HEAT  
(J/Kg Kell.)  
2.4157E 02

WATER LAT. HEAT VAP.  
(J/Kg)  
5.9056E 05



RUN NUMBER: 7905032200  
 START TIME: 22: 0:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel./m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
11.983	7.97	9.42	NO DATA	1017.47	13.519	-1.536	-1.419	-0.274	-0.176

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel./m-2/3)
10.00	12.081	13.245	13.343	9.009E-03	84.32	7.279E-03	11.856	14.060	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.096 AT GMM	MOMENTUM FLUX (Nt/m2) -9.09E-02	FRICTION VELOCITY (Meters/sec) 2.710E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.346E-02	AIR DENSITY (Kg/m3) 1.2376
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.90E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.649E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.901E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4157E-02
Z/L AT GMM -0.113	LAT. HEAT FLUX (Watts/m2) 7.17E-01	SCALING POT. TEMP. (Kelvin) -4.629E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.255E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.9054E-05
Z/L AT 10 METERS -0.087	SEN. HEAT FLUX (Watts/m2) 1.57E-01	ROUGHNESS LENGTH (Meters) 5.502E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.567
MONIN-OBUKHOV LENGTH (Meters) -1.155E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.156E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.00E-02			BAR. PRES. AT WT LEVEL (Millibar) 1018.67
	BOWEN RATIO (no units) 0.219			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
128%	128%	111%	163%	95%	11%	124%	258%	56%	108%	39%	7%	111%
165%	165%	46%	43%	93%	11%	34%	135%	23%	66%	116%	41%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032200  
 START TIME: 22: 0:20 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.061 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -9.96E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.831E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.84E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.941E-05 (3.0E-05)
Z/L AT GMM -0.073 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.03E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.776E-02 (2.0E-02)
Z/L AT 10 METERS -0.056 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.21E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.876E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.777E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.301E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.71E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.188 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
51%	48%	16%	6%	30%	0%	9%	25%	8%	12%	50%	29%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905012330  
START TIME: 22:30:20 PST  
END TIME: 23:00:00 PST  
START DATE: 3 May 1979 (DAY 121)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL.T.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	RAR.PRES.2	SKY RAD.	WIND DIR.
0.205	0.001	0.001	4.988	4.992	4.208	4.147	5.105	-0.091	5.046
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.863	3.875	2.513	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 117451	1421 118638	0.183	111	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL.T.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	RAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.745	8.20	9.47	NO DATA	316.6	1016.53	1.27E 01	13.509	284.964
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	RAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
11.864	7.77	9.43	NO DATA	-0.02	1017.63			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
18.35	11.975	13.010	13.190	9.037E-03	85.93	7.303E-03	11.882	13.828	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
9.20	11.954	13.126	13.216	9.017E-03	85.01	7.281E-03	11.860	13.952	NO DATA

## \* CONTINUE BELOW

RUN NUMBER: 7905012330  
START TIME: 22:30:20 PST  
START DATE: 3 May 1979 (DAY 121)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.047 AT GHM	MOMENTUM FLUX (Nt/m2) -1.07E-01	FRICTION VELOCITY (Meters/sec) 2.939E-01	GENERAL FORM: DN/DZ= [(N1-N2))/(Ln(Z1/Z2)) (Z1+Z2)/2]	GENERAL FORM: N SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.52E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.922E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 4.83E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PSI=PSI1 WS SLOPE= 1.34E 00
Z/L AT GHM -0.058	LAT.HEAT FLUX (Watts/m2) 6.23E 01	SCALING POT. TEMP. (Kelvin) -2.514E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE= -7.81E 03
Z/L AT 10 METERS -0.045	SFN.HEAT FLUX (Watts/m2) 9.25E 00	ROUGHNESS LENGTH (Meters) 7.456E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.24E-03	N=POT.TEMP (Kelvin) Z=HEIGHT (M) Vert Axis PSI=PSI2 PTK SLOPE= -2.15E 01
Z/L AT Z1 -0.082	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.262E-03		N=LnTEMP STRUC (K/M-2/3) Z=HEIGHT (M) Vert Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.041	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.42E 01			
MONIN-OBUKHOV LENGTH (Meters) 2.247E 02	BOWEN RATIO (no units) 0.149			
PSI1 AT Z1= 0.231124 PSI1 AT Z2= 0.130737 PSI2 AT Z1= 0.147231 PSI2 AT Z2= 0.081514				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SFN HEAT TRANSF.COEF.	BULK MOISTURE TRANSF.COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- 0.08E-3 Kg/Kg

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2380
AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4159E 02
WATER LAT. HEAT VAP. (J/cal./Kg) 5.9064E 05

RUN NUMBER: 290503230  
 START TIME: 22:49:28 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.849	7.8	9.43	NO DATA	1017.53	13.509	-1.659	-1.561	-0.397	-0.299
HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.947	13.112	13.210	9.020E-03	85.12	7.284E-03	11.864	13.937	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.110 AT GMM	MOMENTUM FLUX (Nt/m2) -8.69E-02	FRICTION VELOCITY (Meters/sec) 2.649E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.017E-02	AIR DENSITY (Kg/m3) 1.2383
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.83E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.628E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.830E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMM -0.127	LAT HEAT FLUX (Watts/m2) 7.00E 01	SCALING POT.TEMP. (Kelvin) -4.998E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.324E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9061E 05
Z/L AT 10 METERS 0.098	SEN HEAT FLUX (Watts/m2) 1.66E 01	ROUGHNESS LENGTH (Meters) 5.041E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.558
MONIN-ORSHKOV LENGTH (Meters) -1.021E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.146E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.92E 01			BAR.PRES.AT WT LEVEL (Millibar) 1018.73
	POWER RATIO (no units) 0.237			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT HEAT FLUX	SEN HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
131%	151%	120%	168%	96%	11%	125%	264%	60%	108%	36%	80%	120%
162%	162%	46%	43%	90%	11%	34%	133%	23%	66%	113%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 290503230  
 START TIME: 22:30:28 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) 0.075 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -9.25E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.729E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.985E-05 [3.0E-05]
Z/L AT GMM 0.089 [0.02]	LAT HEAT FLUX (Watts/m2) 6.84E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.114E-02 [2.0E-02]
Z/L AT 10 METERS 0.068 [0.02]	SEN HEAT FLUX (Watts/m2) 1.30E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.885E-05 [6.0E-05]
MONIN-ORSHKOV LENGTH (Meters) -1.463E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.610E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.61E 01 [3.0E+01]	
	POWER RATIO (no units) 0.207 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD RICH NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT HEAT FLUX	SEN HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
4%	3%	12%	7%	28%	0%	9%	22%	6%	11%	45%	21%	21%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905032300  
START TIME: 23: 0:30 PST  
END TIME: 23:30:20 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.983	4.986	4.132	4.060	5.104	-0.091	4.989

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.854	3.873	2.518	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W2BFCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)
1411 117020	1421 118156	0.183	110	-0.009	0.000	0.000	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel. xM-2/3)
11.702	7.96	9.44	NO DATA	314.6	1016.51	1.27E 01	13.500	284.919

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
11.816	7.61	9.40	NO DATA	-0.00	1017.61

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	11.882	12.964	13.144	9.019E-03	85.99	7.287E-03	11.856	13.788	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	11.964	13.074	13.165	8.999E-03	85.10	7.266E-03	11.835	13.907	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905032300  
START TIME: 23: 0:30 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.060 AT GMH	MOMENTUM FLUX (Nt/m2) -7.34E-02	FRICTION VELOCITY (Meters/sec) 2.435E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2)) * (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.79	HUMIDITY FLUX (Kg/sec m2) 2.13E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.050E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.89E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.64E 00
Z/L AT GMH -0.072	LAT. HEAT FLUX (Watts/m2) 5.26E 01	SCALING POT. TEMP. (Kelvin) -2.112E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.67E 03
Z/L AT 10 METERS -0.056	SEN. HEAT FLUX (Watts/m2) 6.44E 00	ROUGHNESS LENGTH (Meters) 3.623E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.67E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.56E 01
Z/L AT Z1 -0.102	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.10E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.051	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.17E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.794E 02	BOWEN RATIO (no units) 0.123			
PSI1 AT Z1 = 0.274861 PSI1 AT Z2 = 0.158372 PSI2 AT Z1 = 0.176443 PSI2 AT Z2 = 0.099388				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2382

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4157E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9066E 05

RUN NUMBER: 7905032300  
 START TIME: 23: 0:30 PST  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
11.802	7.66	9.40	NO DATA	1017.51	13.580	-1.698	-1.600	-0.439	-0.341

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	11.900	13.061	13.159	9.002E-03	85.21	7.268E-03	11.838	13.893	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.120 AT GMH	MOMENTUM FLUX (Nt/m2) -8.24E-02	FRICTION VELOCITY (Meters/sec) 2.580E-01	WITH LONG. VFLOCITY (Meter2/sec2) -6.654E-02	AIR DENSITY (Kg/m3) 1.2385
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.78E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.705E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.781E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMH -0.138	LAT. HEAT FLUX (Watts/m2) 6.88E 01	SCALING POT. TEMP. (Kelvin) -5.145E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.327E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9064E 05
Z/L AT 10 METERS -0.106	SEN. HEAT FLUX (Watts/m2) 1.66E 01	ROUGHNESS LENGTH (Meters) 4.549E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.549
MONIN-OBUKHOV LENGTH (Meters) -9.405E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.135E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.81E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.71
	BOWEN RATIO (no units) 0.242			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
158%	158%	146%	184%	117%	11%	135%	301%	73%	111%	44%	93%	146%
161%	161%	46%	43%	89%	11%	33%	132%	23%	66%	112%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032300  
 START TIME: 23: 0:30 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.090 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.03E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.545E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.66E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.090E-05 [3.0E-05]
Z/L AT GMH -0.105 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.57E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.968E-02 [2.0E-02]
Z/L AT 10 METERS -0.081 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.22E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.257E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.238E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.145E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.28E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.295 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
33%	31%	6%	15%	42%	8%	17%	31%	3%	11%	56%	8%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905032330  
START TIME: 23:30:30 PST  
END TIME: 0:00:20 PST  
START DATE: 3 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.RFF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.951	4.954	4.296	4.197	5.097	-0.091	5.062

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.833	3.873	2.518	0.001	0.981	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
141: 115948	142: 117152	0.183	108	-0.009	0.800	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >.05V)	(No. >.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.595	8.28	9.25	NO DATA	317.1	1016.39	1.27E 01	13.480	284.815

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
11.715	7.86	9.20	NO DATA	0.03	1017.49

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	11.775	12.840	13.020	8.905E-03	85.49	7.193E-03	11.703	13.689	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	11.805	12.957	13.047	8.883E-03	84.55	7.170E-03	11.679	13.814	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905032330  
START TIME: 23:30:30 PST  
START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.056 AT GMH	MOMENTUM FLUX (Nt/m2) -1.00E-01	FRICTION VELOCITY (Meters/sec) 2.843E-01	GENERAL FORM: DN/DZ = [(N1-N2)/L(Z1/Z2)]* (Z1+Z2)/2	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.47E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.005E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 4.59E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.41E 00
Z/L AT GMH -0.067	LAT. HEAT FLUX (Watts/m2) 6.18E 01	SCALING POT. TEMP. (Kelvin) -2.691E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.72E 03
Z/L AT 10 METES -0.052	SEN. HEAT FLUX (Watts/m2) 9.59E 00	ROUGHNESS LENGTH (Meters) 6.591E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.43E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.01E 01
Z/L AT Z1 -0.097	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.4781 05		N=LnTEMP.STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.048	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.33E 01			
MOMIN-OBUKHOV LENGTH (Meters) -1.934E 02	BOWEN RATIO (no units) 0.157			
PSI1 AT Z1= 0.259561 PSI1 AT Z2= 0.148614 PSI2 AT Z1= 0.166191 PSI2 AT Z2= 0.093056				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08F-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2386
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9078E 05

RUN NUMBER: 7905032330  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.701	7.91	9.21	NO DATA	1017.39	13.480	-1.779	-1.681	-0.537	-0.439

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.799	12.943	13.041	8.886E-03	84.66	7.173E-02	11.682	13.799	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.113 AT GMH	MOMENTUM FLUX (Nt/m2) -8.94E-02	FRICTION VELOCITY (Meters/sec) 2.686E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.217E-02	AIR DENSITY (Kg/m3) 1.2389
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.99E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.949E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.974E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
Z/L AT GMH -0.131	LAT.HEAT FLUX (Watts/m2) 7.37E 01	SCALING POT.TEMP. (Kelvin) -5.301E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.424E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9070E 05
Z/L AT 10 METERS -0.101	SEN.HEAT FLUX (Watts/m2) 1.78E 01	ROUGHNESS LENGTH (Meters) 5.320E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.527
MONIN-OBUKHOV LENGTH (Meters) -9.898E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.152E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.174E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.04E 02			BAR.PRES.AT WT LEVEL (Millibar) 1010.59
	BOWEN RATIO (no units) 0.242			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
136%	136%	128%	173%	99%	11%	127%	272%	64%	109%	35%	84%	128%
160%	160%	46%	42%	88%	11%	33%	130%	23%	65%	111%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905032330  
 START TIME: 23:30:30 PST  
 START DATE: 3 May 1979 (DAY 123)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.082 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -9.22E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.728E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.88E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.223E-05 [3.0E-05]
Z/L AT GMH -0.097 [0.02]	LAT.HEAT FLUX (Watts/m2) 7.12E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.319E-02 [2.0E-02]
Z/L AT 10 METERS -0.074 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.40E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.750E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.345E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.230E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.99E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.215 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
35%	33%	6%	10%	30%	0%	12%	21%	3%	12%	44%	11%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040800  
START TIME: 0: 0:30 PST  
END TIME: 0:30:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.205	0.001	0.001	4.981	4.986	4.074	3.979	5.075	-0.091	5.048

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.813	3.777	2.518	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 116393	1421 117587	0.183	105	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No.) .005V	B (No.) .005V	(No.) .002V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.639	7.85	9.43	NO DATA	316.6	1016.07	1.27E 01	13.468	284.859

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
11.759	7.46	9.39	NO DATA	0.06	1017.17

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	11.819	12.900	13.080	9.011E-03	86.29	7.282E-03	11.844	13.725	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	11.849	13.017	13.107	8.994E-03	85.39	7.263E-03	11.826	13.849	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040800  
START TIME: 0: 0:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.061 AT GHM	MOMENTUM FLUX (Nt/m2) -9.66E-02	FRICTION VELOCITY (Meters/sec) 2.706E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/1]/[Ln(Z1/Z2)] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[(N1-N2)]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.36E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.055E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.32E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.48E 00
Z/L AT GHM -0.073	LAT. HEAT FLUX (Watts/m2) 5.85E 01	SCALING POT. TEMP. (Kelvin) -2.627E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.66E 03
Z/L AT 10 METERS -0.056	SEN. HEAT FLUX (Watts/m2) 8.90E 00	ROUGHNESS LENGTH (Meters) 5.46E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.32E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.06E 01
Z/L AT Z1 -0.103	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.506E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.052	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.01E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.778E 02	BOWEN RATIO (no units) 0.152			
PSI1 AT Z1= 0.276624 PSI1 AT Z2= 0.159503 PSI2 AT Z1= 0.177626 PSI2 AT Z2= 0.100123				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2388

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4157E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9078E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905040000  
 START TIME: 0: 0:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.744	7.51	9.40	NO DATA	1017.07	13.460	-1.715	-1.617	-0.457	-0.359

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	11.842	13.003	13.101	8.996E-03	85.5%	7.265E-03	11.828	13.835	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.128 AT GMH	MOMENTUM FLUX (Nt/m2) -7.86E-02	FRICTION VELOCITY (Meters/sec) 2.520E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.351E-02	AIR DENSITY (Kg/m3) 1.2382
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.652E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.700E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMH -0.147	LAT. HEAT FLUX (Watts/m2) 6.68E 01	SCALING POT. TEMP. (Kelvin) -5.228E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.318E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9867E 05
Z/L AT 10 METERS -0.113	SFN. HEAT FLUX (Watts/m2) 1.65E 01	ROUGHNESS LENGTH (Meters) 4.152E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.50
MONIN-OBUKHOV LENGTH (Meters) -8.833E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.126E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.60E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.27
	BOWEN RATIO (no units) 0.247			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
137%	137%	129%	174%	101%	11%	128%	275%	65%	109%	36%	85%	129%
161%	161%	46%	43%	89%	11%	33%	132%	23%	66%	112%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040000  
 START TIME: 0: 0:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.092 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.18E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.569E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.63E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.053E-05 [3.0E-05]
Z/L AT GMH -0.107 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.51E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.263E-02 [2.0E-02]
Z/L AT 10 METERS -0.082 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.29E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.595E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.212E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.216E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.27E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.216 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
37%	35%	8%	7%	29%	0%	10%	23%	4%	10%	45%	12%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040030  
START TIME: 0:30:30 PST  
END TIME: 1:00:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.998	5.000	3.980	3.901	5.055	-0.091	4.871

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.791	3.768	2.519	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 117561	1421 118704	0.183	102	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.77

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.756	7.67	9.53	NO DATA	310.6	1015.76	1.27E 01	13.439	284.973

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
11.870	7.32	9.48	NO DATA	0.10	1016.85

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.936	13.026	13.206	9.064E-03	86.19	7.330E-03	11.918	13.827	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.961	13.137	13.227	9.842E-03	85.27	7.307E-03	11.893	13.947	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040030  
START TIME: 0:30:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR.WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.062 AT GMM	MOMENTUM FLUX (Nt/m2) -7.42E-02	FRICTION VELOCITY (Meters/sec) 2.448E-01	GENERAL FORM:DN/DZ= I(N1-N2)/[ln(Z1/Z2)]* (Z1*Z2)1/21	GENERAL FORM: 'N' SLOPE= I(LnZ1-PSI)-(LnZ2-PSI))/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 2.14E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.064E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.90E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.63E 00
Z/L AT GMM -0.074	LAT.HEAT FLUX (Watts/m2) 5.29E 01	SCALING POT. TEMP (Kelvin) -2.179E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -0.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -7.65E 03
Z/L AT 10 METERS -0.057	SFN.HEAT FLUX (Watts/m2) 6.68E 00	ROUGHNESS LENGTH (Meters) 3.703E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.75E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -2.48E 01
Z/L AT Z1 -0.105	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COLF. AT 10 METERS (Dimensionless) 1.3001 95		N=LATHEP.STRUC.(KxM 2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.052	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.23E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.753E 02	BOWEN RATIO (no units) 0.126			
PSI1 AT Z1= 0.279645 PSI1 AT Z2= 0.161442 PSI2 AT Z1= 0.179655 PSI2 AT Z2= 0.101386				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SEN HEAT TRANSF.COEF. (0.92E-03)	BULK MOISTURE TRANSF.COEF. (1.32E-03)
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .08E-3 Kg/Kg

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2370
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4158E 02
WATER LAT.HEAT VAP. (ITcal./Kg) 5.9083E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040030  
 START TIME: 0:30:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.857	7.36	9.49	NO DATA	1016.76	13.439	-1.582	-1.484	-0.315	-0.217

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.955	13.123	13.221	9.045E-03	85.38	7.310E-03	11.897	13.933	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.126 AT GMH	MOMENTUM FLUX (Nt/m2) -7.49E-02	FRICTION VELOCITY (Meters/sec) 2.460E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.050E-02	AIR DENSITY (Kg/m3) 1.2373
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.59E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.481E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.581E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4158E 02
Z/L AT GMH -0.145	LAT. HEAT FLUX (Watts/m2) 6.38E 01	SCALING POT. TEMP. (Kelvin) -4.900E-02	WITH POT. TEMPERATURE (Meter Kelvin./sec) 1.205E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9061E 05
Z/L AT 10 METERS -0.111	SFN. HEAT FLUX (Watts/m2) 1.51E 01	ROUGHNESS LENGTH (Meters) 3.772E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.475
MONIN-OBUKHOV LENGTH (Meters) -8.981E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.116E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.16E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.96
	BOWEN RATIO (no units) 0.236			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
152%	152%	141%	181%	113%	11%	133%	294%	70%	110%	43%	90%	141%
164%	164%	46%	43%	92%	11%	34%	135%	23%	66%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040030  
 START TIME: 0:30:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.093 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -7.47E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.457E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.50E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.951E-05 [3.0E-05]
Z/L AT GMH -0.108 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.17E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.919E-02 [2.0E-02]
Z/L AT 10 METERS -0.083 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.13E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.750E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.202E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.117E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.77E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.202 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
35%	33%	1%	10%	37%	0%	13%	29%	8%	9%	51%	1%	9%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040100  
START TIME: 11:03:30 PST  
END TIME: 11:30:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.019	5.017	3.772	3.711	5.041	-0.091	4.895

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.776	3.761	2.518	0.001	0.001	0.001	0.001	6.285

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118149	1421 119243	0.183	99	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.)0.005V	B(No.)0.005V	(No.)0.002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.76

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.815	7.27	9.65	NO DATA	311.4	1015.54	1.27E 01	13.424	285.030

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
11.924	6.97	9.58	NO DATA	0.14	1016.64

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.995	13.096	13.276	9.137E-03	86.58	7.392E-03	12.016	13.878	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.014	13.199	13.289	9.097E-03	85.53	7.355E-03	11.969	13.994	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040100  
START TIME: 11:03:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGE PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (=UP,=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (=Stable,=Unstable) -0.067 AT GMM	MOMENTUM FLUX (Nt/m2) -5.56E-02	FRICITION VELOCITY (Meters/sec) 2.120E-01	GENERAL FORM:DN/DZ= ((N1-N2)/LN(Z1/Z2))* (Z1+Z2)/2	GENERAL FORM:IN SLOPE= ((LNZ1-PSI1)-(LNZ2-PSI1))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.87E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.116E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.34E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PSI=PSI1 WS SLOPE= 1.89E 00
Z/L AT GMM -0.081	LAT.HEAT FLUX (Watts/m2) 4.61E 01	SCALING POT. TEMP. (Kelvin) -1.759E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE= -7.60E 03
Z/L AT 10 METERS -0.062	SEN.HEAT FLUX (Watts/m2) 4.66E 00	ROUGHNESS LENGTH (Meters) 2.029E-05	N=POT.TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.20E-03	N=POT.TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PSI=PSI2 PTK SLOPE= -3.07E 01
Z/L AT Z1 -0.114	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.049E-03		N=LNTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert Axis PSI=NONE C12 SLOPE=NO DATA
Z/L AT Z2 -0.057	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.35E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.613E 02	BOWEN RATIO (no units) 0.101			
PSI1 AT Z1= 0.297493 PSI1 AT Z2= 0.172978 PSI2 AT Z1= 0.191665 PSI2 AT Z2= 0.108907				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.97E 03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08F-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2365

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4159E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9068E 05

RUN NUMBER: 7905040100  
 START TIME: 1: 0:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.911	7.01	9.59	NO DATA	1016.54	13.424	-1.513	-1.415	-0.237	-0.139

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.009	13.187	13.285	9.102E-03	85.65	7.360E-03	11.975	13.981	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.139 AT GMH	MOMENTUM FLUX (Nt/m2) -6.64E-02	FRICTION VELOCITY (Meters/sec) 2.317E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.368E-02	AIR DENSITY (Kg/m3) 1.2368
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.39E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.346E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.392E-05	AIR SPECIFIC HEAT (ITcal/Kg Kel.) 2.4159E 02
Z/L AT GMH -0.160	LAT. HEAT FLUX (Watts/m2) 5.91E 01	SCALING POT. TEMP. (Kelvin) -4.801E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.112E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9058E 05
Z/L AT 10 METERS -0.123	SFN. HEAT FLUX (Watts/m2) 1.39E 01	ROUGHNESS LENGTH (Meters) 2.960E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.457
MONIN-OBUKHOV LENGTH (Meters) -8.136E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.093E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.58E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.74
	BOWEN RATIO (no units) 0.235			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE +-or--:

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
173%	173%	157%	191%	131%	10%	139%	322%	79%	112%	53%	99%	157%
165%	165%	46%	43%	93%	10%	34%	137%	23%	66%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040100  
 START TIME: 1: 0:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.104 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -6.39E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.272E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.29E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.889E-05 [3.0E-05]
Z/L AT GMH -0.121 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.67E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.706E-02 [2.0E-02]
Z/L AT 10 METERS -0.093 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.01E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.677E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.073E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.094E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.14E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.195 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE +-or--:

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
35%	33%	10%	14%	47%	6%	16%	37%	5%	8%	60%	8%	0%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040130  
START TIME: 11:30:30 PST  
END TIME: 2: 0:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.042	5.039	3.709	3.665	5.032	-0.091	4.851

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.765	3.813	2.517	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118289	1421 119396	0.157	99	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg,True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.829	7.16	9.79	NO DATA	309.9	1015.40	1.27E 01	13.413	285.044

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
11.940	6.94	9.71	NO DATA	0.18	1016.50

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	U.POT.TEMP.1	ABS.HUMID.1	RFL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.009	13.122	13.302	9.220E-03	87.31	7.462E-03	12.127	13.889	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	U.POT.TEMP.2	ABS.HUMID.2	RFL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.030	13.226	13.316	9.177E-03	86.21	7.421E-03	12.075	14.006	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040130  
START TIME: 11:30:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.134 AT GMH	MOMENTUM FLUX (M/m2) -3.65E-02	FRICTION VELOCITY (Meters/sec) 1.718E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1*Z2)^{1/2}]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1)-(LnZ2-PS1))/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^{1/2} 12.99	HUMIDITY FLUX (Kg/sec.m2) 1.61E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.605E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.45E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 2.33E 00
Z/L AT GMH -0.154	LAT. HEAT FLUX (Watts/m2) 3.99E 01	SCALING POT. TEMP. (Kelvin) -2.007E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -7.11E 03
Z/L AT 10 METERS -0.118	SFN. HEAT FLUX (Watts/m2) 4.31E 00	ROUGHNESS LENGTH (Meters) 7.370E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.35E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -2.69E 01
Z/L AT Z1 -0.217	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAG COEF. AT 10 METERS (Dimensionless) 7.479E-04		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT.2 SLOPE=NO DATA
Z/L AT Z2 -0.109	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.69E 01			
MONIN-BRUKHOV LENGTH (Meters) -8.445E 01	BOWEN RATIO (no units) 0.108			
PS11 AT Z1= 0.466815 PS11 AT Z2= 0.288118 PS12 AT Z1= 0.307181 PS12 AT Z2= 0.185351				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2362

AIR SPECIFIC HEAT  
(ITcal./Kg Kel)  
2.4161E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9839E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040130  
 START TIME: 1:30:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10M METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.926	6.97	9.72	NO DATA	1016.41	13.413	-1.487	-1.389	-0.200	-0.102

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M-2/3)
10.00	12.024	13.213	13.311	9.183E-03	86.34	7.426E-03	12.081	13.993	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.140 AT GMM	MOMENTUM FLUX (Nt/m2) -6.54E-02	FRICTION VELOCITY (Meters/sec) 2.300E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.289E-02	AIR DENSITY (Kg/m3) 1.2365
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.29E-05	SCALING SPEC.HUMID. (Kg/Kg) -8.069E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.295E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4160E 02
Z/L AT GMM -0.160	LAT.HEAT FLUX (Watts/m2) 5.67E 01	SCALING POT.TEMP. (Kelvin) -4.740E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.090E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9057E 05
Z/L AT 10 METERS -0.123	SFN.HEAT FLUX (Watts/m2) 1.36E 01	ROUGHNESS LENGTH (Meters) 2.871E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.444
MONIN-OBUKHOV LENGTH (Meters) -8.119E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.090E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.168E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.31E 01			BAR.PRES.AT WT LEVEL (Millibar) 1017.61
	BOWEN RATIO (no units) 0.240			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
218%	218%	218%	228%	166%	11%	161%	395%	109%	119%	57%	129%	218%
166%	166%	46%	44%	94%	11%	34%	138%	23%	67%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040130  
 START TIME: 1:30:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.137 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -6.04E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.198E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.10E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.902E-05 [3.0E-05]
Z/L AT GMM -0.157 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.40E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -2.904E-02 [2.0E-02]
Z/L AT 10 METERS -0.121 [0.02]	SFN.HEAT FLUX (Watts/m2) 1.03E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.338E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -0.257E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.037E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.85E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.206 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE +OR- WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
2%	2%	29%	19%	47%	8%	20%	36%	16%	3%	50%	20%	20%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905040200  
START TIME: 2: 0:40 PST  
END TIME: 2:30:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.038	No.04 DEW POINT2 5.040	No.05 WIND SPEED1 3.771	No.06 WIND SPEED2 3.682	No.07 BAR.PRES.2 5.039	No.08 SKY RAD. -0.091	No.09 WIND DIR. 4.797
No.10 BULK WT TEMP 3.754	No.11 AC FREQUENCY 3.850	No.12 AC VOLTAGE 2.518	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 117548	No.2 AIR TEMP.2 1421 118740	UPWIND NEAR HEIGHT/LENGTH 0.157	UPLAND LAND PATH(Meters) 97	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.038	WTRFCAL (Volts) 0.308	WS1EC (Coeff.) 0.991	WS2EC (Coeff.) 0.959
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V) 0	VOLT.REF.DEV B(No.).005V) 0	ZERO REF.DEV (No.).002V) 0	AC VOLT.FLUX (No.).5V) 0	AC FREQ.FLUX (No.).1Hz) 0	AC VOLTAGE (VAC) 115.2	AC FREQUENCY (Hz) 59.85
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 11.755	WIND SPEED1 (Meter/sec) 7.28	DEW POINT1 (Celsius) 9.77	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 308.1	BAR.PRES.1 (Millibar) 1015.51	SKY RAD. (Watt/m2) 1.27E 01	BULK WT TEMP (Celsius) 13.482	MEAN AIR TEMP (Kelvin) 284.974
AIR TEMP.2 (Celsius) 11.874	WIND SPEED2 (Meter/sec) 6.97	DEW POINT2 (Celsius) 9.71	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.21	BAR.PRES.2 (Millibar) 1016.61			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 11.935	VIR.TEMP.1 (Celsius) 13.045	V.POT.TEMP.1 (Celsius) 13.225	ABS.HUMID.1 (Kg/m3) 9.210E-03	REL.HUMID.1 (Percent) 87.61	SPEC.HUMID.1 (Kg/Kg) 7.451E-03	VAP.PRES.1 (Millibar) 12.110	S.VAP.PRES.1 (Millibar) 13.823	REF.INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 11.964	VIR.TEMP.2 (Celsius) 13.160	V.POT.TEMP.2 (Celsius) 13.251	ABS.HUMID.2 (Kg/m3) 9.182E-03	REL.HUMID.2 (Percent) 86.60	SPEC.HUMID.2 (Kg/Kg) 7.423E-03	VAP.PRES.2 (Millibar) 12.079	S.VAP.PRES.2 (Millibar) 13.947	REF.INDEX 2 (Kel.xM-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040200  
START TIME: 2: 0:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.096 AT GHM	MOMENTUM FLUX (Nt/m2) -6.45E-02	FRICTION VELOCITY (Meters/sec) 2.284E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[(Ln(Z1/Z2)) <sup>2</sup> (Z1+Z2)/2]	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.98E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.348E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 3.43E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.75E 00
Z/L AT GHM -0.112	LAT.HEAT FLUX (Watts/m2) 5.13E 01	SCALING POT. TEMP. (Kelvin) -2.717E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -7.36E 03
Z/L AT 10 METERS -0.086	SEN.HEAT FLUX (Watts/m2) 7.76E 00	ROUGHNESS LENGTH (Meters) 2.789E-05	N=POT.TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.30E-03	N=POT.TEMP. (Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -1.99E 01
Z/L AT Z1 -0.158	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.274E-03		
Z/L AT Z2 -0.079	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.18E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.160E 02	BOWEN RATIO (no units) 0.151			
PSI1 AT Z1= 0.376962 PSI1 AT Z2= 0.225798 PSI2 AT Z1= 0.245583 PSI2 AT Z2= 0.143695				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SFN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

BH1-BH2= +/- .08F-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2367
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4161E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9043E 05



RUN NUMBER: 7905040200  
 START TIME: 2: 0:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.860	7.01	9.72	NO DATA	1016.51	13.402	-1.543	-1.445	-0.256	-0.158

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.958	13.147	13.245	9.184E-03	86.72	7.427E-03	12.083	13.933	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL., 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.142 AT GMM	MOMENTUM FLUX (Nt/m2) -6.63E-02	FRICTION VELOCITY (Meter/sec) 2.316E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.364E-02	AIR DENSITY (Kg/m3) 1.2369
GEOMETRIC MEAN HEIGHT (Meter) GMM=(71*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.30E-05	SCALING SPFC. HUMID. (Kg/Kg) -R.024E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.299E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4160E 02
Z/L AT GMM -0.163	LAT. HEAT FLUX (Watts/m2) 5.68E 01	SCALING POT. TEMP. (Kelvin) -4.884E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.131E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.9061E 05
Z/L AT 10 METERS -0.125	SFN. HEAT FLUX (Watts/m2) 1.42E 01	ROUGHNESS LENGTH (Meters) 2.955E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.435
MONIN-OBUKHOU LENGTH (Meters) -7.988E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRA. COFF. AT 10 METERS (Dimensionless) 1.092E-03		ARS. HUMID. AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.37E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.71
	BOWEN RATIO (no units) 0.249			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRA. COFF.
157%	157%	154%	189%	116%	11%	136%	305%	77%	112%	39%	97%	154%
14%	16%	44%	44%	9%	11%	34%	137%	23%	67%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040200  
 START TIME: 2: 0:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.118 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -6.59E-02 (4.0E-02)	FRICTION VELOCITY (Meter/sec) 2.309E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(71*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.26E-05 (8.0E-06)	SCALING SPFC. HUMID. (Kg/Kg) -7.771E-05 (3.0E-05)
Z/L AT GMM -0.137 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.58E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.267E-02 (2.0E-02)
Z/L AT 10 METERS -0.105 (0.02)	SFN. HEAT FLUX (Watts/m2) 1.13E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.904E-05 (6.0E-05)
MONIN-OBUKHOU LENGTH (Meters) -9.505E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 (2.0E+01)	DRA. COFF. AT 10 METERS (Meters) 1.130E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.13E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.219 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRA. COFF.
20%	19%	2%	6%	28%	0%	9%	24%	1%	4%	37%	1%	4%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905040210  
START TIME: 2:30:50 PST  
END TIME: 3:04:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOIT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.051	5.052	3.429	3.349	5.040	-0.091	4.758
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
HULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOIT. REF. R		
4.742	3.856	2.518	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
ATR TEMP. 1	ATR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 117149	1421 118379	0.157	96	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	FRRNR COUNT	DATA BASE	VOIT. REF. DEV	VOIT. REF. DEV	ZERO REF. DEV	AC VOIT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	HULK WT TEMP	MEAN ATR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.715	6.62	9.85	NO DATA	106.8	1015.52	1.27E 01	13.791	284.934
ATR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIME TARI	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.838	6.36	9.79	NO DATA	0.23	1016.62			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	UTR. TEMP. 1	U. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.895	13.012	13.192	9.248E-03	88.31	7.490E-03	12.174	13.787	NO DATA
HEIGHT, Z2	POT. TEMP. 2	UTR. TEMP. 2	U. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.928	13.130	13.221	9.228E-03	87.23	7.459E-03	12.138	13.914	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040230  
START TIME: 2:30:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
MRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BISINGER, 1973):

START/ITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.146 AT GMM	MOMENTUM FLUX (Nt/m2) -5.45E-02	FRICTION VELOCITY (Meters/sec) 2.098E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/1/ln(Z1/Z2)]$ (Z1=Z2) 1/21	GENERAL FORM: $N/SLOPE = [(1/N1-PSI)-(1/N2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meters) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.99E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.677E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.95E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.91E 00
Z/L AT GMM -0.167	LAT. HEAT FLUX (Watts/m2) 4.93E 01	SCALING POT. TEMP. (Kelvin) -3.203E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.04E 03
Z/L AT 10 METERS -0.129	SEN. HEAT FLUX (Watts/m2) 8.41E 00	ROUGHNESS LENGTH (Meters) 1.939E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.72E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.69E 01
Z/L AT Z1 -0.234	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COFF. AT 10 METERS (Dimensionless) 1.336E-03		N=LAT. TEMP. STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTP SLOPE=NO DATA
Z/L AT Z2 -0.118	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.04E 01			
MONIN-OBUKHOU LENGTH (Meters) -7.781E 01	BOWEN RATIO (no units) 0.171			
PSI1 AT Z1 = 0.492151 PSI1 AT Z2 = 0.306148 PSI2 AT Z1 = 0.324633 PSI2 AT Z2 = 0.197499				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec 2)	THIR. PRANDTL NUMBER	PROFILE TUN. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SKP = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

ATR DENSITY (Kg/m3)	ATR SPECIFIC HEAT (JCal./Kg Kel.)	WATER LAT. HEAT VAP (JCal./Kg)
1.2368	2.4161E 02	5.946E 04

RUN NUMBER: 7905040230  
 START TIME: 2:30:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRFS. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.823	6.39	9.79	NO DATA	1016.53	13.391	-1.568	-1.470	-0.275	-0.177

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	11.921	13.116	13.214	9.232E-03	87.36	7.463E-03	12.143	13.899	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.190 AT 10M	MOMENTUM FLUX (Nt/m2) -5.31E-02	FRICTION VELOCITY (Meters/sec) 2.071E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.291E-02	AIR DENSITY (Kg/m3) 1.2370
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.05E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.998E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.050E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.410E-02
Z/L AT 10M -0.214	LAT. HEAT FLUX (Watts/m2) 5.07E-01	SCALING POT. TEMP. (Kelvin) -5.136E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.044E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9063E-05
Z/L AT 10 METERS -0.165	SFN. HEAT FLUX (Watts/m2) 1.33E-01	ROUGHNESS LENGTH (Meters) 1.831E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.424
MONTN-DRINKHOV LENGTH (Meters) -6.072E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01	DRAO. COFF. AT 10 METERS (Dimensionless) 1.052E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.67E-01			BAR. PRFS. AT WT LEVEL (Millibar) 1017.73
	BOWEN RATIO (no units) 0.263			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAO. COFF.
161%	161%	167%	198%	122%	11%	140%	320%	83%	115%	39%	103%	167%
144%	164%	46%	44%	92%	11%	33%	136%	23%	67%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040230  
 START TIME: 2:30:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.168 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -5.34E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.077E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.04E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.879E-05 [3.0E-05]
Z/L AT 10M -0.190 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.04E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.690E-02 [2.0E-02]
Z/L AT 10 METERS -0.146 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.12E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.863E-05 [6.0E-05]
MONTN-DRINKHOV LENGTH (Meters) -6.831E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E-01 [2.0E+01]	DRAO. COFF. AT 10 METERS (Meters) 1.107E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.55E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.235 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAO. COFF.
13%	12%	1%	2%	22%	0%	5%	21%	1%	2%	29%	1%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905040300  
START TIME: 3: 0:50 PST  
END TIME: 3:30:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMINAL ALTITUDE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL.T. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.085	5.080	3.371	3.321	5.038	-0.091	4.867

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	7ERD REF.	SPARE A	SPARE B	VOL.T. REF. B
3.722	3.878	2.518	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 117771	1421 118910	0.183	92	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL.T. REF. DEV	VOL.T. REF. DEV	7ERD REF. DEV	AC VOL.T. FLUX	AC FRQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
11.777	6.50	10.05	NO DATA	310.5	1015.49	1.27E 01	13.372	284.994

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
11.891	6.26	9.95	NO DATA	0.24	1016.59

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.957	13.093	13.272	9.384E-03	89.14	7.593E-03	12.340	13.843	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.981	13.198	13.289	9.330E-03	87.91	7.544E-03	12.274	13.963	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040300  
START TIME: 3: 0:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMINAL ALTITUDE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BISINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.124 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -4.48E-02	FRICTION VELOCITY (Meters/sec) 1.886E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[ln(Z1/Z2)] + [(Z1*Z2)]/[Z1*Z2]	GENERAL FORM: N SLOPE = [(ln Z1 - PSI) - (ln Z2 - PSI)] / [N1 - N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.76E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.545E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DN/DZ = 2.72E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.12E 00
Z/L AT GMH -0.143	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.35E 01	SCALING POT. TEMP. (Kelvin) -2.282E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.14E 03
Z/L AT 10 METERS -0.110	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 5.39E 00	ROUGHNESS LENGTH (Meters) 1.185E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.70E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.37E 01
Z/L AT Z1 -0.202	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.125E-03		N=Ln TEMP. STRUC. (K-m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONF CT2 SLOPE=NO DATA
Z/L AT Z2 -0.101	TOTAL HEAT RUDGET FLUX (Watts/m <sup>2</sup> ) 6.16E 01			
MONIN-ORINKHOV LENGTH (Meters) -0.067E 01	BOWEN RATIO (no units) 0.124			
PSI1 AT Z1 = 0.445551 PSI1 AT Z2 = 0.278140 PSI2 AT Z1 = 0.292558 PSI2 AT Z2 = 0.175288				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2364

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9862E 05

RUN NUMBER: 7905040300  
 START TIME: 3: 0:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin <sup>2/3</sup> )	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	UIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.877	6.29	9.9A	NO DATA	1016.49	13.372	-1.494	-1.396	-0.186	-0.088

HEIGHT (Meters)	POT. TEMP. (Celsius)	UIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	RFL HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin <sup>2/3</sup> )
10.00	11.975	13.18A	13.284	9.337E-03	88.06	7.550E-03	12.283	13.949	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.190 AT GNM	MOMENTUM FLUX (Nt/m2) -5.11E-02	FRICTION VELOCITY (Meters/sec) 2.033E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec2) -4.133E-02	AIR DENSITY (Kg/m3) 1.2367
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.92E-05	SCALING SPFC. HUMID. (Kg/Kg) -7.633E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.919E-05	ATR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GNM -0.214	LAT. HEAT FLUX (Watts/m2) 4.75E 01	SCALING POT. TEMP. (Kelvin) -4.958E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.008E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9060E 05
Z/L AT 10 METERS -0.165	SEN. HEAT FLUX (Watts/m2) 1.24E 01	ROUGHNESS LENGTH (Meters) 1.682E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.404
MONTN-OBUKHNOV LENGTH (Meters) -6.063E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COFF. AT 10 METERS (Dimensionless) 1.045E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.28E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.69
	BOWEN RATIO (no units) 0.266			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
179%	179%	177%	204%	137%	11%	145%	341%	89%	115%	48%	109%	177%
166%	166%	46%	45%	94%	11%	34%	139%	23%	68%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040300  
 START TIME: 3: 0:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.159 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -4.94E-02 [4.0E-02]	FRICTION VELOCITY (Meters/sec) 2.083E-01 [4.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.89E-05 [8.0E-06]	SCALING SPFC. HUMID. (Kg/Kg) -7.600E-05 [3.0E-05]
Z/L AT GNM -0.180 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.67E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.047E-02 [2.0E-02]
Z/L AT 10 METERS -0.139 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.67E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.541E-05 [4.0E-05]
MONTN-OBUKHNOV LENGTH (Meters) -7.211E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COFF. AT 10 METERS (Dimensionless) 1.060E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.04E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.225 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
21%	20%	7%	5%	38%	8%	9%	34%	4%	1%	47%	5%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905040330  
START TIME: 1:30:50 PST  
END TIME: 4:04:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.285	0.001	0.001	5.111	5.100	3.668	3.617	5.042	-0.091	5.049
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	7ERR REF.	SPARE A	SPARE B	VOLT. OFF. B		
3.711	3.925	2.519	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DIFFERENTIAL	DIFFERENTIAL	WIND CORRECTION	WIND CORRECTION
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)
1411 118678	1421 119724	0.183	93	-0.009	0.000	0.000	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	7ERR REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.2	59.92

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
11.868	7.07	10.20	NO DATA	317.4	1015.56	1.27E 01	13.360	285.000
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TARI	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
11.972	6.80	10.07	NO DATA	0.24	1014.66			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	UTR. TEMP. 1	U. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.048	13.197	13.377	9.474E-03	89.50	7.670E-03	12.465	13.927	NO DATA
HEIGHT, Z2	POT. TEMP. 2	UTR. TEMP. 2	U. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.063	13.291	13.381	9.483E-03	89.14	7.605E-03	12.374	14.039	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040330  
START TIME: 3:30:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BISINGER, 1973):

START/ITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.061 AT GHM	MOMENTUM FLUX (N/m2) -4.50E-02	FRICTION VELOCITY (Meters/sec) 1.909E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(1+(Z1/Z2)^2)] * [(Z1/Z2)^2]/(Z1-Z2)$	GENERAL FORM: $N' SLOPE = [(1+N2-PS1)/(1+N2-PS1)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.67E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.057E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DWS/DZ = 3.05E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 2.10E 00
Z/L AT GHM -0.073	LAT. HEAT FLUX (Watts/m2) 4.12E 01	SCALING POT. TEMP. (Kelvin) -1.312E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.64E 03
Z/L AT 10 METERS -0.054	SEN. HEAT FLUX (Watts/m2) 3.13E 00	ROUGHNESS LENGTH (Meters) 1.255E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -1.66E-03$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -4.12E 01
Z/L AT Z1 -0.105	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 9.495E-04		N=LAT. TEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.052	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.70E 01			
MONTN-BRIKHOU LENGTH (Meters) -1.773E 02	DOWNEN RATIO (no units) 0.074			
PS11 AT Z1 = 0.277222 PS11 AT Z2 = 0.159856 PS12 AT Z1 = 0.178027 PS12 AT Z2 = 0.100373				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE THER. PRANDTL NUMBER 0.74	PROFILE THER. RICHMOTD NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- 0.01E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2361

AIR SPECIFIC HEAT  
(J/Kelvin)  
2.4165E 02

WATER LAT. HEAT VAP.  
(J/Kelvin)  
5.9857E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040330  
 START TIME: 3:30:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.960	6.83	10.09	NO DATA	1014.57	13.360	-1.401	-1.303	-0.081	0.017

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.050	13.279	13.377	9.412E-03	88.30	7.613E-03	12.385	14.026	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIFHF ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.140 AT 10M	MOMENTUM FLUX (Nt/m2) -6.24E-02	FRICTION VELOCITY (Meters/sec) 2.247E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.048E-02	AIR DENSITY (Kg/m3) 1.2364
GEOMETRIC MEAN HEIGHT (Meter) GHH=(71+72)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.01E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.239E-05	WITH ARS. HUMIDITY (Meter Kg/sec m3) 2.011E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT 10M -0.140	LAT. HEAT FLUX (Watts/m2) 4.97E 01	SCALING POT. TEMP. (Kelvin) -4.535E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.019E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9055E 05
Z/L AT 10 METERS -0.123	SEN. HEAT FLUX (Watts/m2) 1.27E 01	ROUGHNESS LENGTH (Meters) 2.604E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.394
MONIN-OBUKHNOV LENGTH (Meters) -0.099E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COFF. AT 10 METERS (Dimensionless) 1.081E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.51E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.77
	BOWEN RATIO (no units) 0.256			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
196%	196%	169%	198%	152%	11%	143%	349%	84%	113%	67%	104%	169%
168%	168%	46%	46%	96%	11%	35%	142%	23%	69%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040330  
 START TIME: 3:30:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.104 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -5.87E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.174E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHH=(71+72)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.95E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.170E-05 (3.0E-05)
Z/L AT 10M -0.120 (0.02)	LAT. HEAT FLUX (Watts/m2) 4.81E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.473E-02 (2.0E-02)
Z/L AT 10 METERS -0.092 (0.02)	SEN. HEAT FLUX (Watts/m2) 9.01E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.210E-05 (6.0E-05)
MONIN-OBUKHNOV LENGTH (Meters) -1.082E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 (2.0E+01)	DRAW COFF. AT 10 METERS (Meters) 1.056E-03 (6.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.14E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.284 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
38%	36%	17%	10%	55%	0%	15%	48%	9%	1%	68%	12%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040400  
START TIME: 4: 0:50 PST  
END TIME: 4:31: 0 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
UNIT REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEFW POINT1	DEFW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 2	SKY RAD.	WIND DIR.
A.205	0.001	0.001	5.135	5.129	3.315	3.231	5.049	-0.091	5.253
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	UNIT REF. B		
3.705	3.866	2.518	0.001	0.001	0.001	0.001	A.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
ATR TEMP. 1	ATR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 119980	1421 121047	0.199	68	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RANGE	UNIT REF. DEW	UNIT REF. DEW	ZERO REF. DEW	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATR TEMP. 1	WIND SPEED1	DEFW POINT1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.998	6.46	10.34	NO DATA	323.6	1015.66	1.27E 01	13.355	285.211
ATR TEMP. 2	WIND SPEED2	DEFW POINT2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.105	6.07	10.25	NO DATA	0.21	1016.76			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.178	13.341	13.520	9.564E-03	89.59	7.744E-03	12.586	14.049	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.195	13.439	13.529	9.511E-03	88.40	7.695E-03	12.521	14.163	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040400  
START TIME: 4: 0:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BISINGER, 1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.050 AT 6M	MOMENTUM FLUX (Nt/m2) -5.98E-02	FRICTION VELOCITY (Meters/sec) 2.200E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Z1-Z2)]* (Z1+Z2)1/2	GENERAL FORM: N'SLOPE= [(1/N1-PSI)-(1/N2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) 6M=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.89E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.949E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= -3.40E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= -1.82E 00
Z/L AT 6M -0.061	LAT. HEAT FLUX (Watts/m2) 4.67E 01	SCALING POT. TEMP. (Kelvin) -1.476E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.79E 03
Z/L AT 10 METERS -0.047	SEN. HEAT FLUX (Watts/m2) 4.04E 00	ROUGHNESS LENGTH (Meters) 2.380E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.89E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.64E 01
Z/L AT Z1 -0.084	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.59E-03	N=LTEMP. STRUC. (K-m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONF	CT2 SLOPE=NO DATA
MONTH-DRINKHOV LENGTH (Meters) -2.135E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.34E 01			
PSI1 AT Z1= 0.240478 PSI1 AT Z2= 0.136580 PSI2 AT Z1= 0.153454 PSI2 AT Z2= 0.085278	BOWEN RATIO (no units) 0.087			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
---	--	---	---	--	--

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2356
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9858E 03



RUN NUMBER: 7905040400  
 START TIME: 4: 0:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.092	6.11	10.24	NO DATA	1016.67	13.355	-1.243	-1.165	0.072	0.170

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.190	13.427	13.525	9.517E-03	88.55	7.701E-03	12.529	14.150	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.178 AT GMH	MOMENTUM FLUX (Nt/m2) -4.77E-02	FRICTION VELOCITY (Meters/sec) 1.965E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.861E-02	AIR DENSITY (Kg/m3) 1.2359
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.71E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.049E-05	WITH ARS. HUMIDITY (Meter Kg/sec m3) 1.712E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT GMH -0.201	LAT. HEAT FLUX (Watts/m2) 4.23E 01	SCALING POT. TEMP. (Kelvin) -4.352E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.552E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9048E 05
Z/L AT 10 METERS -0.155	SFN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 1.439E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.390
MONIN-OBUKHOV LENGTH (Meters) -6.458E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01	DRAW COFF. AT 10 METERS (Dimensionless) 1.033E-03		ARS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.57E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.67
	BOWEN RATIO (no units) 0.253			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
155%	155%	129%	174%	121%	11%	129%	296%	64%	110%	57%	84%	129%
173%	173%	46%	47%	101%	11%	34%	148%	23%	70%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040400  
 START TIME: 4: 0:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.111 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -5.09E-02 [4.0E-02]	FRICTION VELOCITY (Meters/sec) 2.027E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.75E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.010E-05 [3.0E-05]
Z/L AT GMH -0.177 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.32E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.385E-02 [2.0E-02]
Z/L AT 10 METERS -0.098 [0.02]	SFN. HEAT FLUX (Watts/m2) 7.68E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.757E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.021E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.27E 01 [2.0E+01]	DRAW COFF. AT 10 METERS (Meters) 1.165E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.57E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.197 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
58%	55%	11%	6%	43%	0%	2%	44%	6%	1%	64%	8%	27%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905040430  
START TIME: 4:31:10 PST  
END TIME: 5:1:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.124	5.127	2.763	2.671	5.057	-0.090	5.601
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQ. FLUX	AC VOLT. FLUX	MANUAL FLAG	ZFR. REF.	SPARE A	SPARE B	VOLT. REF. B		
3.704	1.409	2.520	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP OFFCAL	DP OFFCAL	WTF OFFCAL	WS OFFCAL	WS OFFCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	WS OFFCAL
1411 12:125	1421 12:205	0.206	56	-0.009	0.000	0.000	0.991	0.947

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL. REF. DEV.	VOL. REF. DEV.	ZFR. REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.)(.005V)	B(No.)(.005V)	(No.)(.002V)	(No.)(5V)	(No.)(1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.112	5.33	10.29	NO DATA	335.4	1015.78	1.24E 01	13.356	285.320
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.204	5.04	10.21	NO DATA	0.17	1016.88			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	U. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.292	13.451	13.631	9.531E-03	88.63	7.719E-03	12.547	14.157	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	U. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.299	13.540	13.630	9.484E-03	87.5R	7.675E-03	12.491	14.262	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040430  
START TIME: 4:31:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.029 AT 6M	MOMENTUM FLUX (Nt/m2) -4.37E-02	FRICITION VELOCITY (Meters/sec) 1.882E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(1+(Z1/Z2)^2)] / (Z1+Z2)1/2$	GENERAL FORM: $N'SLOPE = [(1/N1-PSI1)-(1/N2-PSI2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)1/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.56E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.709E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.25E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.13E 00
Z/L AT 6M -0.036	LAT. HEAT FLUX (Watts/m2) 3.84E 01	SCALING POT. TEMP. (Kelvin) -A.709E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92F-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.84E 03
Z/L AT 10 METERS -0.028	SEN. HEAT FLUX (Watts/m2) 1.58E 00	ROUGHNESS LENGTH (Meters) 1.171E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92F-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.06E 01
Z/L AT Z1 -0.041	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.7871E-03		N=LTEMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-BUKHOV LENGTH (Meters) -3.587E 02	TOTAL HEAT RUDGET FLUX (Watts/m2) 5.27E 01			
PSI1 AT Z1 = 0.158004 PSI1 AT Z2 = 0.086422 PSI2 AT Z1 = 0.099149 PSI2 AT Z2 = 0.053267	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

UNIV. KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92F-03	1.32F-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2353
----------------------------------

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .00F-3 Kg/Kg.  
PTK1-PTK2 = +/- .00R Kel.

AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4164E 02
WATER LAT. HEAT VAP. (Jcal./Kg) 5.9044E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040430  
 START TIME: 4:31:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.197	5.08	10.22	NO DATA	1016.79	13.356	-1.159	-1.061	0.173	0.271

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.295	13.529	13.627	9.490E-03	87.71	7.681E-03	12.498	14.250	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.286 AT GMM	MOMENTUM FLUX (Nt/m2) -3.07E-02	FRICTION VELOCITY (Meter/sec) 1.577E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.486E-02	AIR DENSITY (Kg/m3) 1.2356
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.44E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.397E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.441E-05	ATR SPECIFIC HEAT (ITcal./Kg) 2.4164E 02
Z/L AT GMM -0.317	LAT. HEAT FLUX (Watts/m2) 3.56E 01	SCALING POT. TEMP. (Kelvin) -4.411E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.955E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9042E 05
Z/L AT 10 METERS -0.244	SEN. HEAT FLUX (Watts/m2) 8.69E 00	ROUGHNESS LENGTH (Meters) 4.578E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.393
MONIN-OBUKHOV LENGTH (Meters) -4.104E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01	DRAW COFF. AT 10 METERS (Dimensionless) 9.650E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.69E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.99
	BOWEN RATIO (no units) 0.244			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
200%	200%	123%	173%	173%	11%	127%	347%	62%	112%	112%	82%	123%
177%	177%	46%	47%	105%	11%	33%	152%	23%	70%	128%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040430  
 START TIME: 4:31:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.165 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -3.43E-02 [4.0E-02]	FRICTION VELOCITY (Meter/sec) 1.660E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.47E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.133E-05 [3.0E-05]
Z/L AT GMM -0.165 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.62E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.414E-02 [2.0E-02]
Z/L AT 10 METERS -0.142 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.01E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.040E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.029E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.26E 01 [2.0E+01]	DRAW COFF. AT 10 METERS (Meterless) 1.10E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.69E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.192 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COFF.
78%	76%	1%	5%	61%	0%	47%	68%	10%	5%	78%	6%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040500  
START TIME: 5: 1:30 PST  
END TIME: 5:31:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	5.124	5.112	1.997	1.917	5.063	-0.063	5.957

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.705	3.847	2.519	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1/FCL	DP2/FCL	W1/FCL	W2/FCL	W3/FCL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 121775	1421 122660	0.207	48	-0.009	0.000	0.000	0.591	0.947

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	5.9.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
12.178	3.84	10.28	NO DATA	347.5	1015.89	B. RPE 00	13.355	285.36

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.266	3.65	10.15	NO DATA	0.11	1016.98

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.357	13.515	13.695	9.519E-03	88.16	7.710E-03	12.535	14.219	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.356	13.592	13.683	9.444E-03	86.88	7.643E-03	12.439	14.318	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040500  
START TIME: 5: 1:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.064 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -2.33E-02	FRICTION VELOCITY (Meters/sec) 1.374E-01	GENERAL FORM: DN/DZ = [(N1-N2)/((ln(Z1/Z2))^2)] * (Z1*Z2)^(1/2)	GENERAL FORM: (N) SLOPE = [(ln(Z1-PS1) - (ln(Z2-PS1)))/ (N1-N2)]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.085E-05	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) DWS/DZ = 2.11E-02	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert Axis PS1=PS1 WS SLOPE = 2.91E 00
Z/L AT GMH -0.077	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.97E 01	SCALING POT. TEMP. (Kelvin) -7.085E-03	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) DSH/DZ = -8.92E-06	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert Axis PS1=PS1 SH SLOPE = -7.63E 03
Z/L AT 10 METERS -0.059	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 1.22E 00	ROUGHNESS LENGTH (Meters) 1.918E-04	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) DPT/DZ = -8.92E-04	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert Axis PS1=PS1 PTK SLOPE = 7.64E 01
Z/L AT Z1 0.108	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 0.82E 00	DRAG COEFF. AT 10 METERS (Dimensionless) 2.147E-04		N= TEMP. STRUC. (K/M 2/3) Z= HEIGHT (M) Vert Axis PS1=NONE (1/2) SLOPE=NO DATA
Z/L AT Z2 0.054	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 3.98E 01			
MINI-MONITORING LENGTH (Meters) -1.694E 02	ROSEN RATIO (no units) 0.041			
PS11 AT Z1 = 0.086919 PS11 AT Z2 = 0.166129 PS12 AT Z1 = 0.184545 PS12 AT Z2 = 0.104438				

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TUM PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> )
1.2352

## \* GENERAL NOTES:

Accuracy limitation expected for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.01 K Kg/Kg  
PTK1-PTK2 = +/- 0.08 Kel

AIR SPECIFIC HEAT (J/Kcal /Kg Kel.)
2.416E 02
WATER LAT. HEAT VAP. (J/Kcal /Kg)
5.9040E 05

RUN NUMBER: 7905040500  
 START TIME: 5: 1:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.255	3.67	10.16	NO DATA	1016.89	13.355	-1.100	-1.002	0.228	0.326

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/m3)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.353	13.583	13.681	9.453E-03	87.03	7.651E-03	12.451	14.306	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.701 AT GMM	MOMENTUM FLUX (Nt/m2) -1.45E-02	FRICTION VELOCITY (Meters/sec) 1.085E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.176E-02	AIR DENSITY (Kg/m3) 1.2355
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.06E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.917E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.061E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMM -0.753	LAT. HEAT FLUX (Watts/m2) 2.62E 01	SCALING POT. TEMP. (Kelvin) -4.965E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.384E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9038E 05
Z/L AT 10 METERS -0.580	SEN. HEAT FLUX (Watts/m2) 6.73F 00	ROUGHNESS LENGTH (Meters) 2.895E-07		VAP. PRES. AT WT LEVEL (Millibar) 15.393
MONIN-OBUKHOV LENGTH (Meters) -1.726E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.82E 00	DRAW COEF. AT 10 METERS (Dimensionless) 8.723E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.18E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.09
	BOWEN RATIO (no units) 0.257			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
207%	207%	136%	182%	182%	13%	136%	365%	68%	114%	114%	88%	136%
180%	180%	46%	46%	108%	13%	34%	154%	23%	69%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040500  
 START TIME: 5: 1:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.405 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.68E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.158E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.09E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.604E-05 [3.0E-05]
Z/L AT GMM -0.439 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.69E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.693E-02 [2.0E-02]
Z/L AT 10 METERS -0.338 [0.02]	SEN. HEAT FLUX (Watts/m2) 4.68F 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.243E-07 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.962E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.82E 00 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.164E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.14F 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.193 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
19%	77%	8%	8%	61%	0%	3%	60%	14%	6%	79%	1%	6%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040530 PRINT DATE: 11 JUN 1980  
START TIME: 5:31:50 PST DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
END TIME: 6:21:00 PST DATA AVERAGING PERIOD: 30 Min  
START DATE: 4 May 1979 (DAY 124) NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

\* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.162	5.147	1.837	1.800	5.083	0.026	5.670

No. 10 BULK WT TEMP AT FREQUENCY AC VOLTAGE No. 13 MANUAL FLAG No. 14 ZERO REF. No. 15 SPARE A No. 16 SPARE B No. 17 VOLT. REF. B

3.787	3.849	2.519	0.001	0.001	0.001	0.001	0.001	6.205
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\* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LEND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 12.3329	1421 12.4184	0.206	61	-0.009	0.000	0.000	0.991	0.947

\* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.12V)	(No. 0.5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	189	0	0	0	0	0	115.2	59.85

\* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
12.333	3.25	10.51	NO DATA	337.8	1016.18	-3.6PE 00	13.357	285.536

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TALL	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)
12.418	3.44	10.36	NO DATA	0.04	1017.28

\* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	12.513	13.692	13.872	9.663E-03	88.60	7.829E-03	12.731	14.369	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	RFL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.29	12.509	13.764	13.854	9.574E-03	87.72	7.751E-03	12.617	14.466	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040530 MARINE SURFACE LAYER PRINT DATE: 11 JUN 1980  
START TIME: 5:31:50 PST NRL MICROMETEOROLOGY DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
START DATE: 4 May 1979 (DAY 124) SAN NICOLAS ISLAND, CAL DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.211 AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.03E-02	FRICTION VELOCITY (Meters/sec) 9.120E-02	GENERAL FORM: DN/DZ = [(N1-N2)]/(1/N(21/22)) (Z1+Z2)^(1/2)	GENERAL FORM: N'SLOPE = [(1/N21-PSI1)-(1/N22-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 9.01E-06	SCALING SPEC. HUMID. (Kg/Kg) -8.000E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 1.20E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 4.39E 00
Z/L AT GMM 0.236	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.24E 01	SCALING POT. TEMP. (Kelvin) -8.000E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -6.76E 03
Z/L AT 10 METERS -0.182	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 9.12E-01	ROUGHNESS LENGTH (Meters) 4.736E-08	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -6.76E 01
Z/L AT Z1 -0.553	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -3.62E 00	DRAW COEF. AT 10 METERS (Dimensionless) 1.16E-05		N=LnTEMP. STRUC. (KxM-1/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.167	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.96E 01			
MINIM. OBSCURED LENGTH (Meters) -5.504E 01	ROSEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.609181 PSI1 AT Z2 = 0.391619 PSI2 AT Z1 = 0.405503 PSI2 AT Z2 = 0.255627				

## \* GENERAL CONSTANTS:

VON KARMAN (CONSTANT) (No units) <th>GRAVITATION ACCELERATION (M/sec<sup>2</sup>) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation preceded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

GH1 SHP. +/- 0.01 -3 kg/Kg.  
PTK1 PTK2 +/- 0.008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2348

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4168E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9831E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040530  
 START TIME: 5:31:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.408	3.45	10.37	NO DATA	1017.18	13.357	-0.949	-0.851	0.398	0.496

HEIGHT (Meters)	POT. TFMP. (Celsius)	VIR. TFMP. (Celsius)	V. POT. TFMP. (Celsius)	ABS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.586	13.755	13.853	9.585E-03	87.39	7.760E-03	12.632	14.455	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL., 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.755 AT GMH	MOMENTUM FLUX (Nt/m2) -1.26E-02	FRICTION VELOCITY (Meters/sec) 1.012E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.024E-02	AIR DENSITY (Kg/m3) 1.2351
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.40E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.523E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.401E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.810	LAT. HEAT FLUX (Watts/m2) 2.32E 01	SCALING POT. TEMP. (Kelvin) -4.650E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 4.705E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9030E 05
Z/L AT 10 METERS -0.623	SEN. HEAT FLUX (Watts/m2) 5.88E 00	ROUGHNESS LENGTH (Meters) 1.472E-07		VAP. PRES. AT WT LEVEL (Millibar) 15.400
MONIN-OBUKHOV LENGTH (Meters) -1.604E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.62E 00	DRAG COEF. AT 10 METERS (Dimensionless) 8.580E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.55E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.38
	BOWEN RATIO (no units) 0.253			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
282%	282%	243%	252%	252%	24%	210%	504%	121%	131%	131%	141%	243%
189%	189%	46%	47%	117%	24%	40%	164%	23%	70%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040530  
 START TIME: 5:31:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.536 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.23E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.958E-02 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.34E-06 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.690E-05 (3.0E-05)
Z/L AT GMH -0.580 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.31E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.661E-02 (2.0E-02)
Z/L AT 10 METERS -0.446 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.31E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.239E-07 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -2.242E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.62E 00 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 9.017E-04 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.46E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.201 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
52%	507	2%	37	617	07	12%	59%	6%	3%	72%	0%	21%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905040600  
START TIME: 6: 2:10 PST  
END TIME: 6:32:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD	WIND DIR.
6.205	0.001	0.001	5.150	5.133	1.562	1.455	5.097	0.189	6.261
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.710	3.860	2.519	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND 1 AND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
ATR TEMP. 1	AIR TEMP. 2	HFIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124638	1421 125398	0.201	46	-0.009	0.000	0.000	0.992	0.948

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	R(No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
12.464	3.96	10.44	NO DATA	357.9	1016.40	-2.63E 01	13.360	285.662
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.540	2.84	10.27	NO DATA	-3.05	1017.49			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.644	13.817	13.997	9.615E-03	87.43	7.792E-03	12.674	14.497	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.630	13.878	13.969	9.517E-03	86.04	7.707E-03	12.548	14.585	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040600  
START TIME: 6: 2:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PHYSICAL CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.087 AT GHM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -5.37E-03	FRICTION VELOCITY (Meters/sec) 6.594E-02	GEN. FORM: DN/DZ = [(N1-N2)/(1+(Z1/Z2) <sup>4</sup> )] (Z1*Z2) <sup>1/2</sup>	GENERAL FORM: 'N' SLOPE = [(1+(N1-PS1)-(1+(N2-PS1)))/(N1-N2)]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2) <sup>1/2</sup> 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) -2.44E-06	SCALING SPEC. HUMID. (Kg/Kg) 2.994E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.44E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 6.07E 00
Z/L AT GHM 0.192	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) -6.07E 00	SCALING POT. TEMP. (Kelvin) 4.754E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 9.58E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= 1.81E 04
Z/L AT 10 METERS 0.148	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -3.92E-01	ROUGHNESS LENGTH (Meters) 4.146E-10	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.52E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= 1.14E 02
Z/L AT Z1 0.277	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -2.63E 01	DRAG COEF. AT 10 METERS (Dimensionless) 9.18E-04		N=LNT. STRUC. (KvM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.136	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -3.27E 01			
MONIN-ORUKHOV LENGTH (Meters) 6.756E 01	BOWEN RATIO (no units) 0.065			
PS11 AT Z1= -1.276476 PS11 AT Z2= -0.639977 PS12 AT Z1= -1.724967 PS12 AT Z2= -0.864834				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> ) 1.2345
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9024E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905040600  
 START TIME: 6: 2:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibars)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U. POT-WT TEMP (Kelvin)
12.531	2.86	10.29	NO DATA	1017.40	13.360	-0.829	-0.731	0.511	0.609

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.629	13.871	13.969	9.529E-03	86.20	7.717E-03	12.564	14.575	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.196 AT GMM	MOMENTUM FLUX (Nt/m2) -8.29E-03	FRICTION VELOCITY (Meters/sec) 8.193E-02	WITH LONG. VELOCITY (Meter2/sec2) -6.712E-03	AIR DENSITY (Kg/m3) 1.2349
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.07E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.925E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.018E-06	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -1.272	LAT. HEAT FLUX (Watts/m2) 1.98E 01	SCALING POT. TEMP. (Kelvin) -4.793E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.926E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9023E 05
7/L AT 10 METERS -0.979	SEN. HEAT FLUX (Watts/m2) 4.91E 00	ROUGHNESS LENGTH (Meters) 1.229E-08		VAP. PRES. AT WT LEVEL (Millibar) 15.406
MONIN-OBUKHOV LENGTH (Meters) -1.021E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.63E 01	DRAW COEF. AT 10 METERS (Dimensionless) 8.190E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.60E 00			BAR. PRES. AT WT LEVEL (Millibar) 1018.60
	BOWEN RATIO (no units) 0.248			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
134%	251%	125%	180%	146%	8%	34%	326%	62%	118%	83%	82%	125%
198%	198%	46%	47%	126%	8%	22%	173%	23%	70%	149%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040600  
 START TIME: 6: 2:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.430 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -7.50E-03 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 7.762E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.86E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -3.859E-05 [3.0E-05]
Z/L AT GMM -0.626 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.45E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.410E-02 [2.0E-02]
Z/L AT 10 METERS -0.482 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.44E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.216E-09 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.076E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.63E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 8.431E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.40E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.184 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
152%	118%	3%	75%	89%	8%	53%	52%	11%	146%	137%	8%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040630  
START TIME: 6:32:30 PST  
END TIME: 7:24:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DFW POINT 1	DFW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.184	5.165	1.158	1.080	5.099	0.361	6.548

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRD REF.	SPARE A	SPARE B	VOLT. REF. B
3.715	3.827	2.519	0.001	0.901	0.001	0.001	6.295

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS'EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124903	1421 125723	0.186	49	-0.009	0.000	0.000	0.992	0.951

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERRROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZFRD REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.490	2.32	10.63	NO DATA	7.6	1016.44	-5.04E 01	13.364	285.691

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TALL	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.572	2.17	10.46	NO DATA	-0.14	1017.54

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.670	13.862	14.042	9.743E-03	88.44	7.897E-03	12.844	14.522	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.662	13.929	14.019	9.640E-03	86.97	7.807E-03	12.712	14.617	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040630  
START TIME: 6:32:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUBINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.104 AT 0M	MOMENTUM FLUX (Nt/m2) -1.64E-02	FRICTION VELOCITY (Meters/sec) 1.152E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(1/N(Z1/Z2)) * (Z1*Z2)^{1/2}]$	GENERAL FORM: $N'SLOPE = [(1/N1-PSI1) - (1/N2-PSI2)] / [(N1-N2)]$
GEOMETRIC MEAN HEIGHT (Meters) $GMH = (Z1+Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kg/sec m2) -1.19E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.347E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 1.71E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 3.47E 00
Z/L AT 0M -0.121	LAT. HEAT FLUX (Watts/m2) -2.93E 01	SCALING POT. TEMP. (Kelvin) -7.408E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.00E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 6.48E 03
Z/L AT 10 METERS -0.093	SEN. HEAT FLUX (Watts/m2) 1.07E 00	ROUGHNESS LENGTH (Meters) 4.969E-07	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -7.30E 01
Z/L AT Z1 -0.171	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.04E 01	DRAW COEF. AT 10 METERS (Dimensionless) 6.357E-03		N=LTEMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.086	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.86E 01			
MONIN-ORUKHOV LENGTH (Meters) -1.073E 02	BOWEN RATIO (no units) -0.036			
PSI1 AT Z1= 0.397739 PSI1 AT Z2= 0.239976 PSI2 AT Z1= 0.259777 PSI2 AT Z2= 0.153120				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE ACCELERATION TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92F-03	1.32F-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

PTK1-PTK2: +/- .008 Kcl.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2344

AIR SPECIFIC HEAT  
(ITcal./Kg Kcl.)  
2.4178E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9023E 05

RUN NUMBER: 7905040630  
 START TIME: 6:32:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 MRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.562	2.19	10.48	NO DATA	1017.44	13.364	-0.802	-0.784	0.556	0.654

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.660	13.920	14.010	9.653E-03	87.15	7.810E-03	12.720	14.606	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -2.552 AT 10M	MOMENTUM FLUX (Nt/m2) -4.58E-03	FRICTION VELOCITY (Meters/sec) 6.093E-02	WITH LONG. VELOCITY (Meter2/sec2) -3.713E-03	AIR DENSITY (Kg/m3) 1.2347
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.73E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.690E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.785E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT 10M -2.692	LAT. HEAT FLUX (Watts/m2) 1.43E 01	SCALING POT. TEMP. (Kelvin) -5.609E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.418E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9021E 05
Z/L AT 10 METERS -2.072	SEN. HEAT FLUX (Watts/m2) 4.27E 00	ROUGHNESS LENGTH (Meters) 9.353E-11		VAP. PRES. AT WT LEVEL (Millibar) 15.411
MONIN-OBUKHOV LENGTH (Meters) -4.826E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.04E 01	DRAW COEF. AT 10 METERS (Dimensionless) 7.745E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.18E 01			BAR. PRES. AT WT LEVEL (Millibar) 1018.64
	BOWEN RATIO (no units) 0.299			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
182%	182%	111%	159%	170%	6%	58%	329%	56%	103%	115%	76%	111%
201%	201%	46%	48%	129%	6%	14%	177%	23%	71%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040630  
 START TIME: 6:32:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 MRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.267 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -8.04E-03 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 7.681E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.69E-06 [0.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -1.160E-05 [3.0E-05]
Z/L AT 10M -1.343 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.18E 00 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.833E-02 [2.0E-02]
Z/L AT 10 METERS -1.034 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.89E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.802E-07 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.675E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.04E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.251E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.07E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.182 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
97%	96%	117%	124%	54%	0%	68%	96%	38%	272%	87%	8%	137%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905040830  
START TIME: 8:33:40 PST  
END TIME: 9:33:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.207	5.182	1.259	1.285	5.139	1.015	7.699
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.776	3.758	2.529	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125334	1421 126403	NOT COMPUTED	NOT COMPUTED	-0.009	0.000	0.000	1.000	1.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	FROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .75V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.76

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.533	2.53	10.77	NO DATA	46.8	1017.05	-1.41E 02	13.424	285.747
AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.640	2.67	10.57	NO DATA	-0.48	1018.15			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.713	13.918	14.098	9.839E-03	89.02	7.972E-03	12.972	14.572	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.731	14.006	14.097	9.711E-03	87.18	7.862E-03	12.808	14.691	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040830  
START TIME: 8:33:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.254 AT GHM	MOMENTUM FLUX (Nt/m2) -1.98E-02	FRICTION VELOCITY (Meters/sec) 1.265E-01	GEN. FORM: $DN/DZ = [(N1-N2)] / [(Ln(Z1/Z2))]^2$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1) - (LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -1.76E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.125E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = -1.61E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.16E 00
7/L AT GHM -0.282	LAT. HEAT FLUX (Watts/m2) -4.34E 01	SCALING POT. TEMP. (Kelvin) -1.76E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.23E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 4.80E 03
Z/L AT 10 METERS -0.217	SFN. HEAT FLUX (Watts/m2) 2.80E 00	ROUGHNESS LENGTH (Meters) 1.060E-00	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.93E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.06E 01
7/L AT Z1 -0.398	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.41E 02	DRAW COEF. AT 10 METERS (Dimensionless) 5.885E-03		N=LTEMP. STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
7/L AT Z2 -0.200	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.02E 02			
MONIN-OBUKHOV LENGTH (Meters) -4.611E 01	BOWEN RATIO (no units) -0.064			
PSI1 AT Z1 = 0.675163 PSI1 AT Z2 = 0.441382 PSI2 AT Z1 = 0.451278 PSI2 AT Z2 = 0.289694				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROF. PRANDTL TUR. NUMBR	PROF. SCHMIDT TUR. NUMBR	BULK HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2348

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9820E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905040830  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.627	2.66	10.59	NO DATA	1018.05	13.424	-0.796	-0.698	0.572	0.670

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.725	13.996	14.094	9.726E-03	87.40	7.875E-03	12.828	14.677	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.454 AT 10M	MOMENTUM FLUX (Nt/m2) -7.02E-03	FRICTION VELOCITY (Meters/sec) 7.536E-02	WITH LONG. VELOCITY (Meter2/sec2) -5.680E-03	AIR DENSITY (Kg/m3) 1.2351
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.93E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.449E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.934E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4170E 02
Z/L AT 10M -1.542	LAT. HEAT FLUX (Watts/m2) 1.71E 01	SCALING POT. TEMP. (Kelvin) -4.917E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.786E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -1.187	SEN. HEAT FLUX (Watts/m2) 4.63E 00	ROUGHNESS LENGTH (Meters) 3.732E-09		VAP. PRES. AT WT LEVEL (Millibar) 15.480
MONIN-OBUKHOV LENGTH (Meters) -8.424E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.41E 02	DRAW COEF. AT 10 METERS (Dimensionless) 8.053E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.20E 02			BAR. PRES. AT WT LEVEL (Millibar) 1019.25
	BOWEN RATIO (no units) 0.270			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
147%	147%	136%	159%	132%	5%	37%	291%	68%	90%	64%	88%	136%
202%	202%	46%	48%	130%	5%	8%	178%	23%	71%	153%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040830  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.760 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.02E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.828E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.72E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 7.913E-06 [3.0E-05]
Z/L AT 10M -0.813 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.01E 00 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.698E-02 [2.0E-02]
Z/L AT 10 METERS -0.626 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.72E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.501E-07 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.597E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.41E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.958E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.31E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.143 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
91%	78%	12%	172%	25%	0%	28%	120%	32%	314%	63%	1%	148%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040900  
START TIME: 9: 3:40 PST  
END TIME: 9:33:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	5.206	5.183	1.165	1.189	5.147	1.347	7.247

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRO REF.	SPARE A	SPARE B	VOLT. REF. B
3.803	3.739	2.529	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP2FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125112	1421 126150	0.136	63	-0.009	0.000	0.000	0.994	0.965

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.74

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.511	2.34	10.76	NO DATA	31.4	1017.17	-1.88E 02	13.458	285.723

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.615	2.40	10.57	NO DATA	-0.54	1018.27

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.691	13.895	14.075	9.834E-03	89.89	7.966E-03	12.965	14.553	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.705	13.982	14.072	9.717E-03	87.37	7.865E-03	12.815	14.668	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905040900  
START TIME: 9: 3:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.979 AT GMH	MOMENTUM FLUX (Nt/m2) -7.46E-03	FRICTION VELOCITY (Meters/sec) 7.769E-02	GENERAL FORM: $DN/DZ = [ (N1-N2) / (Ln(Z1/Z2)) * (Z1*Z2) ] / Z1$	GENERAL FORM: $N'SLOPE = [ (LnZ1-PS1) - (LnZ2-PS1) ] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.16E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.208E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 7.41E-03	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 5.15E 00
Z/L AT GMH -1.844	LAT. HEAT FLUX (Watts/m2) -2.86E 01	SCALING POT. TEMP. (Kelvin) -1.686E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.13E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= 4.48E 03
Z/L AT 10 METERS -0.803	SEN. HEAT FLUX (Watts/m2) 1.64E 00	ROUGHNESS LENGTH (Meters) 5.853E-09	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.57E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -3.21E 01
Z/L AT Z1 -1.474	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.88E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.822E-03		N=LnTEMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.739	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.15E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.245E 01	ROSEN RATIO (no units) -0.057			
PS11 AT Z1= 1.286332 PS11 AT Z2= 0.937949 PS12 AT Z1= 0.870674 PS12 AT Z2= 0.632883				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2= +0.028 of Mean Value.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2351

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9821E 05

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.602	2.40	10.60	NO DATA	1018.18	13.450	-0.848	-0.750	0.521	0.619

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.700	13.971	14.069	9.732E-03	87.57	7.877E-03	12.834	14.655	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -2.022 AT GMH	MOMENTUM FLUX (Nt/m2) -5.59E-03	FRICTION VELOCITY (Meters/sec) 6.727E-02	WITH LONG. VELOCITY (Meter2/sec2) -4.525E-03	AIR DENSITY (Kg/m3) 1.2354
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.31E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.587E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.305E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4170E 02
Z/L AT GMH -2.138	LAT. HEAT FLUX (Watts/m2) 1.56E 01	SCALING POT. TEMP. (Kelvin) -5.430E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.653E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -1.645	SEN. HEAT FLUX (Watts/m2) 4.57E 00	ROUGHNESS LENGTH (Meters) 5.899E-10		VAP. PRES. AT WT LEVEL (Millibar) 15.509
MONIN-OBUKHOV LENGTH (Meters) -6.078E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.88E 02	DRAG COEF. AT 10 METERS (Dimensionless) 7.881E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.68E 02			BAR. PRES. AT WT LEVEL (Millibar) 1019.38
	BOWEN RATIO (no units) 0.293			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
257%	257%	360%	339%	316%	5%	45%	655%	180%	159%	136%	200%	360%
197%	197%	46%	48%	125%	5%	7%	173%	23%	71%	148%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040900  
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 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.569 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -5.80E-03 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.845E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.08E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -1.511E-05 [3.0E-05]
Z/L AT GMH -1.663 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.01E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.484E-02 [2.0E-02]
Z/L AT 10 METERS -1.280 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.74E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.522E-09 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.812E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.88E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 9.517E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.74E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.220 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
34%	33%	2%	138%	43%	0%	17%	92%	10%	351%	54%	0%	131%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905040930  
START TIME: 9:33:40 PST  
END TIME: 10:3:50 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.197	5.171	0.989	1.048	5.164	1.478	6.688

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRO REF.	SPARE A	SPARE B	VOLT.REF.B
3.854	3.808	2.527	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125082	1421 125990	0.168	56	-0.009	0.000	0.000	0.993	0.956

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZFRO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.)0.005V	B(No.)0.005V	(No.)0.002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.508	2.01	10.71	NO DATA	12.4	1017.43	-2.96E 02	13.500	285.714

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.599	2.12	10.50	NO DATA	-0.59	1018.53

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.688	13.887	14.067	9.804E-03	88.01	7.940E-03	12.925	14.554	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.689	13.959	14.049	9.672E-03	87.02	7.826E-03	12.755	14.657	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905040930  
START TIME: 9:33:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.208 AT GHM	MOMENTUM FLUX (Nt/m2) -1.03E-02	FRICTION VELOCITY (Meters/sec) 9.147E-02	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$ (Z1=Z2)1/21	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.29E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.138E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= -1.21E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 4.37E 00
Z/L AT GHM -0.234	LAT. HEAT FLUX (Watts/m2) -3.18E 01	SCALING POT. TEMP. (Kelvin) -7.990E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.27E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 4.75E 03
Z/L AT 10 METERS -0.180	SEN. HEAT FLUX (Watts/m2) 9.14E-01	ROUGHNESS LENGTH (Meters) 4.903E-08	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -6.76E 01
Z/L AT Z1 -0.338	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.06E 02	DRAW COEF. AT 10 METERS (Dimensionless) 6.505E-03		N=LnTEMP. STRUC. (Klm-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.165	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.37E 02			
MOMIN-OBUKHOV LENGTH (Meters) -5.559E 01	BOWEN RATIO (no units) -0.029			
PSI1 AT Z1= 0.605583 PSI1 AT Z2= 0.388987 PSI2 AT Z1= 0.403032 PSI2 AT Z2= 0.253794				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2354

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

PTK1-PTK2= +/- .008 Kml.

AIR SPECIFIC HEAT  
(ITcal./Kg Kml.)  
2.4170E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9021E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905040930  
 START TIME: 9:33:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.588	2.11	10.52	NO DATA	1018.43	13.500	-0.912	-0.814	0.450	0.548

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.686	13.950	14.048	9.688E-03	87.24	7.839E-03	12.776	14.645	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -3.026 AT GMH	MOMENTUM FLUX (Nt/m2) -4.23E-03	FRICTION VELOCITY (Meters/sec) 5.848E-02	WITH LONG. VELOCITY (Meter2/sec2) -3.420E-03	AIR DENSITY (Kg/m3) 1.2358
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.78E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.997E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.779E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH -3.189	LAT. HEAT FLUX (Watts/m2) 1.43E 01	SCALING POT. TEMP. (Kelvin) -6.121E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.580E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -2.454	SEN. HEAT FLUX (Watts/m2) 4.48E 00	ROUGHNESS LENGTH (Meters) 4.062E-11		VAP. PRES. AT WT LEVEL (Millibar) 15.563
MONIN-OBUKHOV LENGTH (Meters) -4.074E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.06E 02	DRAG COEF. AT 10 METERS (Dimensionless) 7.692E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.87E 02			BAR. PRES. AT WT LEVEL (Millibar) 1019.63
	BOWEN RATIO (no units) 0.313			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
207%	207%	152%	169%	198%	5%	23%	367%	76%	93%	122%	96%	152%
191%	191%	46%	47%	119%	5%	6%	167%	23%	70%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905040930  
 START TIME: 9:33:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.672 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -5.65E-03 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.616E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.70E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 3.583E-06 [3.0E-05]
Z/L AT GMH -1.769 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.19E 00 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.239E-02 [2.0E-02]
Z/L AT 10 METERS -1.361 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.14E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.521E-08 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.346E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.06E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.966E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.99E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.207 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
84%	84%	6%	13%	59%	0%	14%	89%	28%	326%	82%	0%	109%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905041000  
START TIME: 10: 4: 0 PST  
END TIME: 10:34:10 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.199	5.175	0.969	1.043	5.168	1.967	6.212

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRO REF.	SPARE A	SPARE B	VOLT. REF. B
3.893	3.820	2.525	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LNGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125535	1421 126472	0.201	59	-0.009	0.000	0.000	0.992	0.948

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	FARON COUNT	DATA BASE	VIN T. REF. DEV	VULT REF. DEV	ZFRO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No.) .005V	B (No.) .005V	(No.) .002V	(No.) 25V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.554	1.97	10.73	NO DATA	356.2	1017.49	-2.74E-02	13.538	285.760

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.647	2.09	10.53	NO DATA	-0.61	1018.58

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.733	13.934	14.114	9.811E-03	88.62	7.946E-03	12.937	14.598	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.737	14.010	14.100	9.688E-03	86.90	7.840E-03	12.778	14.704	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041000  
START TIME: 10: 4: 0 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.167 AT GMH	MOMENTUM FLUX (N/m2) -1.19E-02	FRICTION VELOCITY (Meters/sec) 9.825E-02	GENERAL FORM: DN/DZ = 1/(N1-N2)/11n(Z1/Z2) + (Z1*Z2)1/2	GENERAL FORM: N SLOPE = 1/(N1-Z1) - 1/(N2-Z2) (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.26E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.039E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DN/DZ = -1.35E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PSI=PSI1 SH SLOPE = 4.07E-03
Z/L AT GMH -0.189	LAT. HEAT FLUX (Watts/m2) -3.17E-01	SCALING POT. TEMP. (Kelvin) -7.789E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.19E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE = 5.20E-03
Z/L AT 10 METERS -0.146	SEN. HEAT FLUX (Watts/m2) 9.57E-01	ROUGHNESS LENGTH (Meters) 1.086E-07	N=POT. TEMP (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 8.92E-04	N=POT. TEMP (Kelvin) Z=HEIGHT (M) Vert Axis PSI=PSI2 PTX SLOPE = -6.94E-01
Z/L AT Z1 -0.247	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 0.0571 03		N=LAT. TEMP. STRUC (K-M-2/3) Z=HEIGHT (M) Vert Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.134	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.04E-02			
MONIN-OBUKHOV LENGTH (Meters) -6.872E-01	ROWEN RATIO (no units) -0.031			
PSI1 AT Z1 = 0.512315 PSI1 AT Z2 = 0.350007 PSI2 AT Z1 = 0.352352 PSI2 AT Z2 = 0.217089				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF	BULK MOISTURE TRANSF. COEF
0.4	9.7959	0.74	0.74	0.921-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2358

\* GENERAL NOTES:  
Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

PTK1-PTK2 = 1/2 008 Kml.

AIR SPECIFIC HEAT  
(J/Kg K)  
1.01E+02  
WATER LAT. HEAT VAP  
(J/Kg)  
5.4019E+07

**F/G 4/2**

MAY 82 T V BLANC

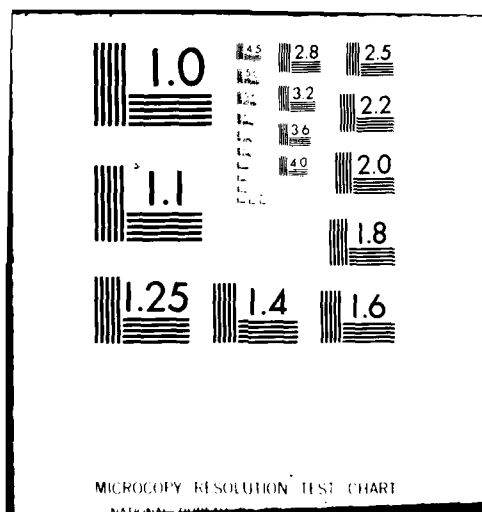
NRL-MR-4713

**24.**

3.7

AD A  
1164 0

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RUN NUMBER: 7905041000  
 START TIME: 10: 4: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 15N METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.636	2.08	10.55	NO DATA	1018.49	13.538	-0.902	-0.804	0.462	0.560

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.734	14.000	14.098	9.703E-03	87.11	7.852E-03	12.797	14.692	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -3.127 AT GMH	MOMENTUM FLUX (Nt/m2) -4.10E-03	FRICTION VELOCITY (Meters/sec) 5.763E-02	WITH LONG. VELOCITY (Meter2/sec2) -3.321E-03	AIR DENSITY (Kg/m3) 1.2336
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.74E-06	SCALING SPEC. HUMID. (Kg/Kg) -8.058E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.738E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4170E 02
Z/L AT GMH -3.294	LAT. HEAT FLUX (Watts/m2) 1.42E 01	SCALING POT. TEMP. (Kelvin) -6.141E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.539E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -2.535	SEN. HEAT FLUX (Watts/m2) 4.42E 00	ROUGHNESS LENGTH (Meters) 2.982E-11		VAP. PRES. AT WT LEVEL (Millibar) 15.602
MONIN-OBUKHOV LENGTH (Meters) -3.944E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E 02	DRAG COEF. AT 10 METERS (Dimensionless) 7.673E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.56E 02			BAR. PRES. AT WT LEVEL (Millibar) 1019.69
	BOWEN RATIO (no units) 0.312			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
194%	194%	132%	160%	185%	5%	17%	345%	66%	94%	119%	86%	132%
192%	192%	46%	47%	120%	5%	6%	167%	23%	70%	143%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041000  
 START TIME: 10: 4: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.654 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -6.13E-03 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.814E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.56E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -1.675E-06 [3.0E-05]
Z/L AT -1.749 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.85E 00 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.211E-02 [2.0E-02]
Z/L AT 10 METERS -1.346 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.06E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.624E-08 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.428E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 2.465E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.60E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.200 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
89%	89%	7%	129%	58%	8%	10%	91%	33%	311%	84%	8%	168%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041030  
START TIME: 10:34:20 PST  
END TIME: 11:43:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.215	5.108	1.004	1.023	5.166	2.445	5.340

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRO REF.	SPARE A	SPARE B	VOLT.REF.B
3.954	3.819	2.528	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 127064	1421 128227	0.199	108	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.706	2.04	10.82	NO DATA	326.5	1017.46	-3.41E 02	13.597	285.975

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.823	2.06	10.60	NO DATA	-0.61	1018.56

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.886	14.096	14.276	9.865E-03	88.27	7.995E-03	13.015	14.745	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.913	14.193	14.283	9.732E-03	86.36	7.881E-03	12.844	14.874	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041030  
START TIME: 10:34:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -2.470 AT GHM	MOMENTUM FLUX (N/m2) NOT COMPUTED	FRICTION VELOCITY (Meters/sec) NOT COMPUTED	GENERAL FORM: DN/DZ= [(N1-N2)/[Ln(Z1/Z2)]] (Z1+Z2)/2	GENERAL FORM: 'N' SLOPE= [(LnZ1-PS1)-(LnZ2-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.993	HUMIDITY FLUX (Kg/sec m2) NOT COMPUTED	SCALING SPEC. HUMID. (Kg/Kg) NOT COMPUTED	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.40E-03	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE=NOT COMPUTED
Z/L AT GHM NOT COMPUTED	LAT. HEAT FLUX (Watts/m2) NOT COMPUTED	SCALING POT. TEMP. (Kelvin) NOT COMPUTED	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.27E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE=NOT COMPUTED
Z/L AT 10 METERS NOT COMPUTED	SEN. HEAT FLUX (Watts/m2) NOT COMPUTED	ROUGHNESS LENGTH (Meters) NOT COMPUTED	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.97E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= NOT COMPUTED
Z/L AT Z1 NOT COMPUTED	SKY AND SOLAR HEAT FLUX (Watts/m2) NOT COMPUTED	DRAW COEF. AT 10 METERS (Dimensionless) 5.187E-03		N=LnTEMP.STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 NOT COMPUTED	TOTAL HEAT BUDGET FLUX (Watts/m2) NOT COMPUTED			
MONIN-OBUKHOV LENGTH (Meters) NOT COMPUTED	BOWEN RATIO (no units) NOT COMPUTED			
PS11 AT Z1=NOT COMPUTED PS11 AT Z2=NOT COMPUTED PS12 AT Z1=NOT COMPUTED PS12 AT Z2=NOT COMPUTED				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Profile data Richardson Number (RI) (-2.0); functional limitations exceeded for computing Z/L as a function of RI. Profile Z/L and Z/L dependent calculations not executed.  
Accuracy limitations exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2= +0.028 of Mean Value.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2345

AIR SPECIFIC HEAT  
(ITcal./Kg.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg.)  
5.9009E 05

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.809	2.06	10.63	NO DATA	1018.47	13.597	-0.788	-0.690	0.584	0.682
HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.907	14.181	14.279	9.748E-03	86.58	7.994E-03	12.865	14.859	NO DATA

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -3.025 AT GNM	MOMENTUM FLUX (Nt/m2) -4.00E-03	FRICTION VELOCITY (Meters/sec) 5.694E-02	WITH LONG. VELOCITY (Meter2/sec2) -3.243E-03	AIR DENSITY (Kg/m3) 1.2348
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.67E-06	SCALING SPEC.HUMID. (Kg/Kg) -8.061E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.668E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4171E 02
Z/L AT GNM -3.188	LAT.HEAT FLUX (Watts/m2) 1.40E 01	SCALING POT.TEMP. (Kelvin) -5.807E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 3.307E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9007E 05
Z/L AT 10 METERS -2.454	SEN.HEAT FLUX (Watts/m2) 4.13E 00	ROUGHNESS LENGTH (Meters) 2.312E-11		VAP.PRES.AT WT LEVEL (Millibar) 15.662
MONIN-OBUKHOV LENGTH (Meters) -4.075E 00	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.41E 02	DRAW COEF.AT 10 METERS (Dimensionless) 7.658E-04		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.23E 02			BAR.PRES.AT WT LEVEL (Millibar) 1019.67
	BOWEN RATIO (no units) 0.295			

GRAD.RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF
230%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
202%	202%	46%	47%	130%	5%	5%	178%	23%	70%	153%	43%	40%

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -2.766 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) NOT COMPUTED	FRICTION VELOCITY (Meter/s) NOT COMPUTED
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) NOT COMPUTED	SCALING SPEC.HUMID. (Kg/Kg) NOT COMPUTED
Z/L AT GMM NOT COMPUTED	LAT.HEAT FLUX (Watts/m2) NOT COMPUTED	SCALING POT.TEMP. (Kelvin) NOT COMPUTED
Z/L AT 10 METERS NOT COMPUTED	SEN.HEAT FLUX (Watts/m2) NOT COMPUTED	ROUGHNESS LENGTH (Meters) NOT COMPUTED
MONIN-OBUKHOV LENGTH (Meters) NOT COMPUTED	SKY AND SOLAR HEAT FLUX (Watts/m2) NOT COMPUTED	DRAG COEF.AT 10 METERS (Meters) 1.080F-U.S
	TOTAL HEAT BUDGET FLUX (Watts/m2) NOT COMPUTED	
	BOWEN RATIO (no units) NOT COMPUTED	

[illegible]

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905041100  
START TIME: 11: 4:40 PST  
END TIME: 11:34:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.251	5.217	1.529	1.549	5.159	2.571	5.186

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK W1 TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.996	3.896	2.528	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125979	1421 127504	0.183	151	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK W1 TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.598	3.00	11.04	NO DATA	318.6	1017.35	-3.59E 02	13.639	285.834

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
12.750	3.01	10.78	NO DATA	-0.59	1018.45

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.778	14.007	14.187	1.001E-02	90.19	8.112E-03	13.283	14.639	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.841	14.136	14.227	9.847E-03	87.78	7.974E-03	12.993	14.802	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041100  
START TIME: 11: 4:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -2.712 AT GMH	MOMENTUM FLUX (Nt/m2) NOT COMPUTED	FRICTION VELOCITY (Meters/sec) NOT COMPUTED	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))]^*$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI) - (LnZ2-PSI)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.993	HUMIDITY FLUX (Kg/sec m2) NOT COMPUTED	SCALING SPEC. HUMID. (Kg/Kg) NOT COMPUTED	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 9.38E-03	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE=NOT COMPUTED
Z/L AT GMH NOT COMPUTED	LAT. HEAT FLUX (Watts/m2) NOT COMPUTED	SCALING POT. TEMP. (Kelvin) NOT COMPUTED	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.54E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= NOT COMPUTED
Z/L AT 10 METERS NOT COMPUTED	SEN. HEAT FLUX (Watts/m2) NOT COMPUTED	ROUGHNESS LENGTH (Meters) NOT COMPUTED	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -7.00E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= NOT COMPUTED
Z/L AT Z1 NOT COMPUTED	SKY AND SOLAR HEAT FLUX (Watts/m2) NOT COMPUTED	DRAW COEF. AT 10 METERS (Dimensionless) 3.503E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTZ SLOPE=NO DATA
Z/L AT Z2 NOT COMPUTED	TOTAL HEAT BUDGET FLUX (Watts/m2) NOT COMPUTED			
MOMIN-ORUKHOV LENGTH (Meters) NOT COMPUTED	BOWEN RATIO (no units) NOT COMPUTED			
PSI1 AT Z1=NOT COMPUTED PSI1 AT Z2=NOT COMPUTED PSI2 AT Z1=NOT COMPUTED PSI2 AT Z2=NOT COMPUTED				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2347

## \* GENERAL NOTES:

Profile data Richardson Number (RI) (-2.8); functional limitations exceeded for computing Z/L as a function of RI. Profile Z/L and Z/L dependent calculations not executed.  
Accuracy limitations exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WS1-WS2 = +0.028 of Mean Value.

AIR SPECIFIC HEAT  
(ITcal./Kg.)  
2.4174E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg.)  
5.9815E 05



RUN NUMBER: 7905041100  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.732	3.01	10.01	NO DATA	1018.35	13.639	-0.987	-0.809	0.482	0.580

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.830	14.121	14.219	9.867E-03	88.07	7.998E-03	13.019	14.782	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRFD MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -1.086 AT GNM	MOMENTUM FLUX (Nt/m2) -9.29E-03	FRICTION VELOCITY (Meters/sec) 8.673E-02	WITH LONG. VELOCITY (Meter2/sec2) -7.523E-03	AIR DENSITY (Kg/m3) 1.2349
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.94E-06	SCALING SPEC.HUMID. (Kg/Kg) -7.413E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.940E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4173E 02
Z/L AT GNM -1.158	LAT.HEAT FLUX (Watts/m2) 1.96E 01	SCALING POT.TEMP. (Kelvin) -4.890E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 4.242E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9011E 05
Z/L AT 10 METERS -0.891	SEN.HEAT FLUX (Watts/m2) 5.30E 00	ROUGHNESS LENGTH (Meters) 2.579E-08		VAP.PRES.AT WT LEVEL (Millibar) 15.703
MONIN-OBUKHOV LENGTH (Meters) -1.122E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.59E 02	DRAW COEF.AT 10 METERS (Dimensionless) 8.288E-04		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.34E 02			BAR.PRES.AT WT LEVEL (Millibar) 1019.55
	BOWEN RATIO (no units) 0.270			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
213%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
192%	192%	46%	48%	120%	5%	6%	168%	23%	71%	143%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041100  
 START TIME: 11: 4:40 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -1.857 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) NOT COMPUTED	FRICTION VELOCITY (Meters/sec) NOT COMPUTED
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) NOT COMPUTED	SCALING SPEC.HUMID. (Kg/Kg) NOT COMPUTED
Z/L AT GNM NOT COMPUTED	LAT.HEAT FLUX (Watts/m2) NOT COMPUTED	SCALING POT.TEMP. (Kelvin) NOT COMPUTED
Z/L AT 10 METERS NOT COMPUTED	SEN.HEAT FLUX (Watts/m2) NOT COMPUTED	ROUGHNESS LENGTH (Meters) NOT COMPUTED
MONIN-OBUKHOV LENGTH (Meters) NOT COMPUTED	SKY AND SOLAR HEAT FLUX (Watts/m2) NOT COMPUTED	DRAW COEF.AT 10 METERS (Meters) 1.018E-03
	TOTAL HEAT BUDGET FLUX (Watts/m2) NOT COMPUTED	
	BOWEN RATIO (no units) NOT COMPUTED	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
44%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	173%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041230  
START TIME: 12:30:20 PST  
END TIME: 13:00:10 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.179	5.164	3.624	3.553	5.108	2.704	4.818

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.993	3.924	2.524	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123115	1421 124374	0.157	139	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.>.005V)	B(No.>.005V)	(No.>.002V)	(No.>.5V)	(No.>.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.92

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.312	7.00	10.60	NO DATA	308.8	1016.56	-3.77E 02	13.635	285.534

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.437	6.73	10.46	NO DATA	-0.42	1017.66

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.491	13.679	13.859	9.731E-03	89.31	7.881E-03	12.820	14.355	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.528	13.793	13.883	9.643E-03	87.72	7.805E-03	12.710	14.490	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041230  
START TIME: 12:30:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.160 AT GMH	MOMENTUM FLUX (Nt/m2) -5.56E-02	FRICTION VELOCITY (Meters/sec) 2.122E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [Ln(Z1/Z2)]$	GENERAL FORM: $N/SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.03E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.752E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.94E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.89E 00
Z/L AT GMH -0.182	LAT. HEAT FLUX (Watts/m2) 5.02E 01	SCALING POT. TEMP. (Kelvin) -3.513E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -6.97E 03
Z/L AT 10 METERS -0.140	SEN. HEAT FLUX (Watts/m2) 9.32E 00	ROUGHNESS LENGTH (Meters) 2.036E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.04E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.54E 01
Z/L AT Z1 -0.254	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.77E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.203E-03		N=LnTEMP.STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.129	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.18E 02			
MONIN-OBUKHOV LENGTH (Meters) -7.155E 01	BOWEN RATIO (no units) 0.186			
PSI1 AT Z1= 0.519043 PSI1 AT Z2= 0.325471 PSI2 AT Z1= 0.343187 PSI2 AT Z2= 0.210572				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFITE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

BH1-BH2= +/- .88E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	1.2352
AIR SPECIFIC HEAT (ITcal./Kg Kel.)	2.416E 02
WATER LAT. HEAT VAP. (ITcal./Kg)	5.9032E 05

RUN NUMBER: 7905041230  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TL. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.422	6.76	10.48	NO DATA	1017.57	13.635	11.115	11.115	0.144	0.242

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.520	13.779	13.877	9.654E-03	87.91	7.814E-03	12.723	14.474	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.127 AT GHM	MOMENTUM FLUX (Nt/m2) -6.89E-02	FRICTION VELOCITY (Meters/sec) 2.219E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.926E-02	AIR DENSITY (Kg/m3) 1.2355
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.96E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.139E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.963E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4169E 02
Z/L AT GHM -0.146	LAT. HEAT FLUX (Watts/m2) 4.85E 01	SCALING POT. TEMP. (Kelvin) -4.028E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.939E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9029E 05
Z/L AT 10 METERS -0.112	SEN. HEAT FLUX (Watts/m2) 1.12E 01	ROUGHNESS LENGTH (Meters) 2.473E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.687
MONIN-OBUKHOV LENGTH (Meters) -8.914E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.77E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.076E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.185E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.17E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.77
	BOWEN RATIO (no units) 0.230			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
168%	168%	178%	205%	127%	5%	24%	332%	89%	116%	38%	109%	178%
175%	175%	46%	46%	103%	5%	7%	149%	23%	69%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041230  
 START TIME: 12:30:20 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.144 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -5.98E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.199E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.98E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.381E-05 [3.0E-05]
Z/L AT GHM -0.164 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.88E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.633E-02 [2.0E-02]
Z/L AT 10 METERS -0.126 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.03E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.349E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.920E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.77E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.196E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.17E 02 [3.8E+01]	
	BOWEN RATIO (no units) 0.216 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
12%	11%	5%	2%	9%	0%	0%	11%	3%	4%	8%	4%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041300  
START TIME: 13: 0:20 PST  
END TIME: 13:30:10 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.173	5.154	3.810	3.714	5.095	3.205	4.753
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.040	3.862	2.522	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WSIEC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125176	1421 126389	0.157	133	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.518	7.35	10.57	NO DATA	306.6	1016.38	-4.47E 02	13.681	285.738
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter RSL)	(Millibar)			
12.639	7.03	10.40	NO DATA	-0.34	1017.48			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.697	13.883	14.063	9.699E-03	87.90	7.863E-03	12.787	14.548	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.729	13.989	14.980	9.594E-03	86.21	7.772E-03	12.655	14.680	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041300  
START TIME: 13: 0:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.092 AT GMH	MOMENTUM FLUX (Nt/m2) -7.05E-02	FRICTION VELOCITY (Meters/sec) 2.390E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) -2.44E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.266E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.61E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.67E 00
Z/L AT GMH -0.108	LAT. HEAT FLUX (Watts/m2) -6.02E 01	SCALING POT. TEMP. (Kelvin) -2.894E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.01E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 6.54E 03
Z/L AT 10 METERS -0.083	SEN. HEAT FLUX (Watts/m2) 8.64E 00	ROUGHNESS LENGTH (Meters) 3.362E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.53E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.87E 01
Z/L AT Z1 -0.155	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.47E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.363E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.076	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.99E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.203E 02	BOWEN RATIO (no units) -0.143			
PSI1 AT Z1 = 0.367506 PSI1 AT Z2 = 0.219427 PSI2 AT Z1 = 0.239169 PSI2 AT Z2 = 0.139472				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTE:  
NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2341

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4169E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9020E 05

RUN NUMBER: 7905041300  
START TIME: 13: 0:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.624	WIND SPEED (Meter/sec) 7.07	DEW POINT (Celsius) 10.42	TEMP.STRUC. (Kelvin-2/3) NO DATA	BAR.PRES. (Millibar) 1017.38	BULK WT TEMP (Celsius) 13.681	AIR-WT TEMP (Kelvin) -1.057	POT-WT TEMP (Kelvin) -0.959	VIR-WT TEMP (Kelvin) 0.296	V.POT-WT TEMP (Kelvin) 0.394
HEIGHT (Meters) 10.00	POT.TEMP. (Celsius) 12.722	VIR.TEMP. (Celsius) 13.977	V.POT.TEMP. (Celsius) 14.075	ABS.HUMID. (Kg/m3) 9.607E-03	REL.HUMID. (Percent) 86.41	SPEC.HUMID. (Kg/Kg) 7.783E-03	VAP.PRES. (Millibars) 12.671	S.VAP.PRES. (Millibars) 14.664	REF.INDEX (Kelvin-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.098 AT GMM	MOMENTUM FLUX (Nt/m2) -6.76E-02	FRICTION VELOCITY (Meters/sec) 2.340E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.478E-02	AIR DENSITY (Kg/m3) 1.2344
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.12E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.351E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.124E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMM -0.114	LAT.HEAT FLUX (Watts/m2) 5.25E 01	SCALING POT.TEMP. (Kelvin) -3.518E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.234E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -0.088	SEN.HEAT FLUX (Watts/m2) 1.03E 01	ROUGHNESS LENGTH (Meters) 3.086E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.731
MONIN-OBUKHOV LENGTH (Meters) -1.136E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.47E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.096E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.188E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.84E 02			BAR.PRES.AT WT LEVEL (Millibar) 1018.58
	BOWEN RATIO (no units) 0.196			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
150%	150%	147%	174%	110%	5%	21%	284%	74%	100%	37%	94%	147%
182%	182%	46%	46%	110%	5%	7%	156%	23%	69%	133%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041300  
START TIME: 13: 0:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.095 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -6.83E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.352E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.18E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -1.001E-05 [3.0E-05]
Z/L AT GMM -0.111 [0.02]	LAT.HEAT FLUX (Watts/m2) 2.90E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.029E-02 [2.0E-02]
Z/L AT 10 METERS -0.085 [0.02]	SEN.HEAT FLUX (Watts/m2) 9.46E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.173E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.172E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.47E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.153E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.13E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.076 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
3%	3%	2%	225%	9%	0%	16%	221%	1%	265%	12%	2%	13%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041330  
START TIME: 13:30:20 PST  
END TIME: 14: 0:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.148	No.04 DEW POINT2 5.129	No.05 WIND SPEED1 4.115	No.06 WIND SPEED2 4.009	No.07 BAR.PRES.2 5.083	No.08 SKY RAD. 3.201	No.09 WIND DIR. 4.765
No.10 BULK WT TEMP 4.073	No.11 AC FREQUENCY 3.865	No.12 AC VOLTAGE 2.514	No.13 MANUAL FLAG 0.001	No.14 ZFRD REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 125298	No.2 AIR TEMP.2 1421 126485	UPWIND NEAR HEIGHT/LENGTH 0.157	UPWIND LAND PATH(Meters) 127	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.993	WS2EC (Coeff.) 0.959
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).5V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 59.87
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.530	WIND SPEED1 (Meter/sec) 7.94	DEW POINT1 (Celsius) 10.42	TEMP.STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg.True) 307.0	BAR.PRES.1 (Millibar) 1016.18	SKY RAD. (Watt/m2) -4.46E 02	BULK WT TEMP (Celsius) 13.714	MEAN AIR TEMP (Kelvin) 285.749
AIR TEMP.2 (Celsius) 12.649	WIND SPEED2 (Meter/sec) 7.57	DEW POINT2 (Celsius) 10.25	TEMP.STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.24	BAR.PRES.2 (Millibar) 1017.28			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.710	VIR.TEMP.1 (Celsius) 13.882	V.POT.TEMP.1 (Celsius) 14.062	ABS.HUMID.1 (Kg/m3) 9.603E-03	REL.HUMID.1 (Percent) 86.98	SPEC.HUMID.1 (Kg/Kg) 7.786E-03	VAP.PRES.1 (Millibar) 12.662	S.VAP.PRES.1 (Millibar) 14.556	REF.INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.739	VIR.TEMP.2 (Celsius) 13.986	V.POT.TEMP.2 (Celsius) 14.076	ABS.HUMID.2 (Kg/m3) 9.498E-03	REL.HUMID.2 (Percent) 85.31	SPEC.HUMID.2 (Kg/Kg) 7.696E-03	VAP.PRES.2 (Millibar) 12.528	S.VAP.PRES.2 (Millibar) 14.686	REF.INDEX 2 (Kelvin-2/3) NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041330  
START TIME: 13:30:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR.WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.067 AT GHM	MOMENTUM FLUX (Nt/m2) -8.18E-02	FRICTION VELOCITY (Meters/sec) 2.575E-01	GENERAL FORM:DN/DZ= [(N1-N2)]/LN(Z1/Z2)* (Z1+Z2)/2	GENERAL FORM:N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -2.56E-05	SCALING SPEC.HUMID. (Kg/Kg) 8.066E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.07E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.55E 00
Z/L AT GHM -0.080	LAT.HEAT FLUX (Watts/m2) -6.33E 01	SCALING POT. TEMP. (Kelvin) -2.587E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.01E-05	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= 6.70E 03
Z/L AT 10 METERS -0.062	SEN.HEAT FLUX (Watts/m2) 8.32E 00	ROUGHNESS LENGTH (Meters) 4.519E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.24E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -2.09E 01
Z/L AT Z1 -0.113	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.33E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.057	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.01E 02			
MONIN-OBUKHOV LENGTH (Meters) -1.625E 02	BOWEN RATIO (no units) -0.13			
PSI1 AT Z1= 0.295984 PSI1 AT Z2= 0.171998 PSI2 AT Z1= 0.190648 PSI2 AT Z2= 0.108267				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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\* GENERAL NOTES:  
NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2339

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9019E 03

\* CONTINUED ON NEXT PAGE

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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-m-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.634	7.62	10.27	NO DATA	1017.18	13.714	-1.086	-0.982	0.259	0.357

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m-2/3)
10.00	12.732	13.973	14.071	9.511E-03	85.51	7.707E-03	12.545	14.671	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.079 AT GMM	MOMENTUM FLUX (Nt/m2) -8.11E-02	FRICTION VELOCITY (Meters/sec) 2.564E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.574E-02	AIR DENSITY (Kg/m3) 1.2342
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.41E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.608E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.408E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4166E 02
Z/L AT GMM -0.094	LAT. HEAT FLUX (Watts/m2) 5.95E 01	SCALING POT. TEMP. (Kelvin) -3.463E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 0.880E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -0.072	SFN. HEAT FLUX (Watts/m2) 1.11E 01	ROUGHNESS LENGTH (Meters) 4.443E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.762
MONIN-OBUKHOV LENGTH (Meters) -1.385E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.133E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.76E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.38
	BOWEN RATIO (no units) 0.186			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or -":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
147%	147%	140%	168%	108%	5%	21%	276%	78%	98%	38%	90%	146%
181%	181%	46%	45%	109%	5%	7%	154%	23%	68%	132%	43%	40%

\* CONTINUED BELOW

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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.072 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -8.13E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.567E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.36E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -1.220E-05 [3.0E-05]
Z/L AT GMM -0.086 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.37E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.782E-02 [2.0E-02]
Z/L AT 10 METERS -0.066 [0.02]	SFN. HEAT FLUX (Watts/m2) 9.69E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.460E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.588E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.46E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.177E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.08E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.073 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or -":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
9%	8%	8%	211%	14%	0%	17%	206%	0%	266%	18%	1%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905041400  
START TIME: 14: 0:40 PST  
END TIME: 14:30:50 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	5.148	5.142	4.314	4.197	5.065	2.810	4.893
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.069	3.860	2.513	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2		UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W51EC	W52EC
AIR TEMP. 1	AIR TEMP. 2		HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125025	1421 126259		0.183	119	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .15V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	8	0	115.1	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel. xM-2/3)
12.503	8.31	10.42	NO DATA	311.4	1015.91	-3.92E 02	13.709	285.724
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.626	7.85	10.33	NO DATA	-0.14	1017.01			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.682	13.854	14.034	9.599E-03	87.11	7.784E-03	12.654	14.527	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.716	13.970	14.060	9.547E-03	85.69	7.737E-03	12.591	14.661	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041400  
START TIME: 14: 0:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
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DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.052 AT GMH	MOMENTUM FLUX (Nt/m2) -1.15E-01	FRICTION VELOCITY (Meters/sec) 3.058E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(1+Ln(Z1/Z2))] * (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.79	HUMIDITY FLUX (Kg/sec m2) -6.63E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.966E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.98E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.31E 00
Z/L AT GMH -0.063	LAT. HEAT FLUX (Watts/m2) 6.47E 01	SCALING POT. TEMP. (Kelvin) -2.936E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.76E 03
Z/L AT Z1 -0.039	SEN. HEAT FLUX (Watts/m2) 1.12E 01	ROUGHNESS LENGTH (Meters) 8.624E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.74E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.84E 01
Z/L AT Z2 -0.044	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.92E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.64E-05		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MININ-GRUKHOV LENGTH (Meters) -2.072E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.16E 02			
PSI1 AT Z1= 0.246109 PSI1 AT Z2= 0.140115 PSI2 AT Z1= 0.157206 PSI2 AT Z2= 0.087559	BOWEN RATIO (no units) 0.173			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by interpolation of:

SH1 SH2 +/- .00F -3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2337

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.416E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9021E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905041400  
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MARINE SURFACE LAYER  
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 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.611	7.92	10.34	NO DATA	1016.91	13.709	-1.098	-1.000	0.247	0.345

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.709	13.956	14.054	9.553E-03	86.03	7.742E-03	12.599	14.645	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.072 AT GMH	MOMENTUM FLUX (N/m2) -8.92E-02	FRICTION VELOCITY (Meters/sec) 2.688E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.226E-02	AIR DENSITY (Kg/m3) 1.2339
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.45E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.390E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.451E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMH -0.085	LAT. HEAT FLUX (Watts/m2) 6.06E 01	SCALING POT. TEMP. (Kelvin) -3.454E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.285E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9018E 05
Z/L AT 10 METERS -0.066	SEN. HEAT FLUX (Watts/m2) 1.16E 01	ROUGHNESS LENGTH (Meters) 5.332E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.753
MONIN-OBUKHOV LENGTH (Meters) -1.526E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.92E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.153E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.20E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.11
	BOWEN RATIO (no units) 0.191			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
125%	125%	118%	167%	91%	5%	24%	258%	59%	108%	32%	79%	118%
180%	180%	46%	45%	108%	5%	8%	153%	23%	68%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041400  
 START TIME: 14: 0:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.066 (0.02) AT GMH	MOMENTUM FLUX (N/m2) -9.65E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.792E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.42E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.227E-05 (3.0E 05)
Z/L AT GMH -0.072 (0.02)	LAT. HEAT FLUX (Watts/m2) 6.15E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.038E-02 (2.0E-02)
Z/L AT 10 METERS -0.055 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.14E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.493E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.807E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.92E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.270E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.17E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.184 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
17%	16%	15%	4%	2%	0%	1%	5%	7%	3%	10%	26%	23%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041430  
START TIME: 14:31: 0 PST  
END TIME: 15: 1:10 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.265	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.131	No.04 DEW POINT2 5.156	No.05 WIND SPEED1 3.853	No.06 WIND SPEED2 3.738	No.07 BAR.PRES.2 5.064	No.08 SKY RAD. 2.089	No.09 WIND DIR. 5.118
No.10 BULK WT TEMP 4.042	No.11 AC FREQUENCY 3.826	No.12 AC VOLTAGE 2.511	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 124517	No.2 AIR TEMP.2 1421 125671	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 112	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 1	DATA BASE (No. scans) 179	VOLT.REF.DEV A(No.)005V 0	VOLT.REF.DEV B(No.)005V 0	ZERO REF.DEV (No.)002V 0	AC VOLT.FLUX (No.)5V 0	AC FRFQ.FLUX (No.)1Hz 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 59.83
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.452	WIND SPEED1 (Meter/sec) 7.43	DEW POINT1 (Celsius) 10.32	TEMP.STRUC.1 (Kel.xM-2/3) NO DATA	WIND DIR. (Deg.True) 319.0	BAR.PRES.1 (Millibar) 1015.90	SKY RAD. (Watt/m2) -2.91E 02	BULK WT TEMP (Celsius) 13.683	MEAN AIR TEMP (Kelvin) 285.669
AIR TEMP.2 (Celsius) 12.567	WIND SPEED2 (Meter/sec) 7.02	DEW POINT2 (Celsius) 10.41	TEMP.STRUC.2 (Kel.xM-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.04	BAR.PRES.2 (Millibar) 1017.00			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.632	VIR.TEMP.1 (Celsius) 13.795	V.POT.TEMP.1 (Celsius) 13.974	ABS.HUMID.1 (Kg/m3) 9.538E-03	REL.HUMID.1 (Percent) 86.83	SPEC.HUMID.1 (Kg/Kg) 7.733E-03	VAP.PRES.1 (Millibar) 12.572	S.VAP.PRES.1 (Millibar) 14.478	REF. INDEX 1 (Kel.xM-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.657	VIR.TEMP.2 (Celsius) 13.918	V.POT.TEMP.2 (Celsius) 14.009	ABS.HUMID.2 (Kg/m3) 9.600E-03	REL.HUMID.2 (Percent) 86.68	SPEC.HUMID.2 (Kg/Kg) 7.779E-03	VAP.PRES.2 (Millibar) 12.659	S.VAP.PRES.2 (Millibar) 14.604	REF. INDEX 2 (Kel.xM-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041430  
START TIME: 14:31: 0 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.048 AT GHM	MOMENTUM FLUX (Nt/m2) -9.32E-02	FRICTION VELOCITY (Meters/sec) 2.748E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)1/(Ln(Z1/Z2)* (Z1+Z2)1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.35E-05	SCALING SPEC.HUMID. (Kg/Kg) -A.930F-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.51E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.46E 00
Z/L AT GHM -0.059	LAT. HEAT FLUX (Watts/m2) 5.81F 01	SCALING POT. TEMP. (Kelvin) -2.232E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.80E 03
Z/L AT 10 METERS -0.045	SEN. HEAT FLUX (Watts/m2) 7.66E 00	ROUGHNESS LENGTH (Meters) 5.800E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.87E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.42E 01
Z/L AT Z1 -0.093	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.91E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.76E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.042	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.26E 02			
MINI-MORPHOLOGY LENGTH (Meters) -2.215E 02	BOWEN RATIO (no. units) 0.132			
PSI1 AT Z1 = 0.233669 PSI1 AT Z2 = 0.112373 PSI2 AT Z1 = 0.148922 PSI2 AT Z2 = 0.082535				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32F-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- 0.081-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2339

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4169E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9024E 05

RUN NUMBER: 7905041430  
 START TIME: 14:31: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.553	7.07	10.40	NO DATA	1016.90	13.683	-1.130	-1.032	0.220	0.318

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.651	13.903	14.001	9.593E-03	86.78	7.773E-03	12.649	14.589	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.104 AT GMH	MOMENTUM FLUX (Nt/m2) -6.77E-02	FRICTION VELOCITY (Meters/sec) 2.342E-01	WITH LONG. VELOCITY (Meter2/sec2) -0.484E-02	AIR DENSITY (Kg/m3) 1.2341
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.13E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.386E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.134E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.121	LAT. HEAT FLUX (Watts/m2) 5.27E 01	SCALING POT. TEMP. (Kelvin) -3.722E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.715E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9021E 05
Z/L AT 10 METERS -0.093	SEN. HEAT FLUX (Watts/m2) 1.09E 01	ROUGHNESS LENGTH (Meters) 3.093E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.726
MONIN-OBUKHOV LENGTH (Meters) -1.074E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.91E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.097E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.188E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.28E 02			BAR. PRES. AT WT LEVEL (Millibar) 1018.10
	BOWEN RATIO (no units) 0.206			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
131%	131%	117%	167%	98%	5%	28%	265%	58%	108%	40%	78%	117%
178%	178%	46%	45%	106%	5%	9%	152%	23%	68%	129%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905041430  
 START TIME: 14:31: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.072 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -7.49E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.457E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.10E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.209E-05 (3.0E-05)
Z/L AT GMH -0.085 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.39E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.581E-02 (2.0E-02)
Z/L AT 10 METERS -0.065 (0.02)	SEN. HEAT FLUX (Watts/m2) 9.20E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.051E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.528E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.91E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.264E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.27E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.179 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
39%	37%	19%	6%	18%	8%	1%	22%	9%	3%	33%	24%	24%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041500  
START TIME: 15: 1:20 PST  
END TIME: 15:31:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.157	5.176	3.886	3.768	5.050	3.531	5.049
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.970	3.821	2.511	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	DP1FCAL	DP2FCAL	WTFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126814	1421 128035	0.183	196	-0.009	0.030	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FRQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Milliarc)	(Celsius)	(Kelvin)
12.681	7.49	10.47	NO DATA	316.7	1015.68	-4.92E 02	13.710	285.902
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.863	7.08	10.53	NO DATA	0.06	1016.77			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.861	14.039	14.219	9.625E-03	86.48	7.812E-03	12.697	14.695	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.894	14.167	14.257	9.670E-03	86.06	7.843E-03	12.761	14.829	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041500  
START TIME: 15: 1:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.058 AT GHM	MOMENTUM FLUX (Nt/m2) -1.01E-01	FRICITION VELOCITY (Meters/sec) 2.867E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1*Z2)^(1/2)]	GENERAL FORM: N SLOPE = [(Ln(Z1-PS1)) - (Ln(Z2-PS1))]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.48E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.029E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.61E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.40E 00
Z/L AT GHM -0.070	LAT. HEAT FLUX (Watts/m2) 6.14E 01	SCALING POT. TEMP. (Kelvin) -2.849E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -7.64E 03
Z/L AT 10 METERS -0.054	SEN. HEAT FLUX (Watts/m2) 1.02E 01	ROUGHNESS LENGTH (Meters) 6.794E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.61E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -1.90E 01
Z/L AT Z1 -0.072	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.92E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.880E 03		N=Ln TEMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.050	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.21E 02			
MONIN-OBUKHOF LENGTH (Meters) -1.856E 02	BOWEN RATIO (no units) 0.166			
PS11 AT Z1 = 0.267781 PS11 AT Z2 = 0.153845 PS12 AT Z1 = 0.171694 PS12 AT Z2 = 0.096448				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2325

AIR SPECIFIC HEAT  
(ITcal./Kg Kel)  
.41695 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9011E 05

RUN NUMBER: 7905041500  
 START TIME: 15: 1:20 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.789	7.13	10.53	NO DATA	1016.68	13.710	-0.921	-0.823	0.442	0.540

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.887	14.152	14.250	9.665E-03	86.10	7.840E-03	12.754	14.813	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.083 AT GMH	MOMENTUM FLUX (Nt/m2) -6.89E-02	FRICTION VELOCITY (Meter/sec) 2.364E-01	WITH LONG. VLOCITY (Meter2/sec2) -5.590E-02	AIR DENSITY (Kg/m3) 1.2328
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.10E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.205E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.100E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH -0.100	LAT. HEAT FLUX (Watts/m2) 5.19E 01	SCALING POT. TEMP. (Kelvin) -3.129E-02	WITH POT. TEMPERATURE (Meter Kelvin./sec) 7.398E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9008E 05
Z/L AT 10 METERS -0.077	SEN. HEAT FLUX (Watts/m2) 9.23E 00	ROUGHNESS LENGTH (Meters) 3.216E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.750
MONIN-OBUKHOV LENGTH (Meters) -1.304E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.92E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.100E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.31E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.88
	BOWEN RATIO (no units) 0.178			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
123%	123%	115%	166%	91%	5%	19%	257%	58%	108%	33%	78%	115%
191%	191%	46%	46%	119%	5%	7%	165%	23%	69%	142%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905041500  
 START TIME: 15: 1:20 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.068 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -7.81E-02 [6.0E-02]	FRICTION VELOCITY (Meter/sec) 2.507E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.18E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.137E-05 [3.0E-05]
Z/L AT GMH -0.082 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.39E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.902E-02 [2.0E-02]
Z/L AT 10 METERS -0.063 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.77E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.491E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.591E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.92E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.381E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.29E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.173 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
28%	19%	23%	10%	5%	0%	1%	4%	11%	1%	6%	31%	33%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905041530  
START TIME: 15:31:40 PST  
END TIME: 16:15:50 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.144	No.04 DEW POINT2 5.169	No.05 WIND SPEED1 4.329	No.06 WIND SPEED2 4.164	No.07 BAR.PRES.2 5.036	No.08 SKY RAD. 3.521	No.09 WIND DIR. 5.086
No.10 BULK WT TEMP 4.122	No.11 AC FREQUENCY 3.818	No.12 AC VOLTAGE 2.512	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 128108	No.2 AIR TEMP.2 1421 129180	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 100	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No.scans) 0	ERROR COUNT (No.scans) 0	DATA BASE (No.scans) 180	VOLT.REF.DEV A(No.).005V 0	VOLT.REF.DEV B(No.).005V 0	ZERO REF.DEV (No.).002V 0	AC VOLT.FLUX (No.).5V 0	AC FREQ.FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 59.81
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.811	WIND SPEED1 (Meter/sec) 8.34	DEW POINT1 (Celsius) 10.40	TEMP.STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg.True) 317.9	BAR.PRES.1 (Millibar) 1015.47	SKY RAD. (Watt/m2) -4.91E 02	BULK WT TEMP (Celsius) 13.761	MEAN AIR TEMP (Kelvin) 286.024
AIR TEMP.2 (Celsius) 12.918	WIND SPEED2 (Meter/sec) 7.80	DEW POINT2 (Celsius) 10.49	TEMP.STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.14	BAR.PRES.2 (Millibar) 1016.56			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.991	VIR.TEMP.1 (Celsius) 14.162	V.POT.TEMP.1 (Celsius) 14.342	ABS.HUMID.1 (Kg/m3) 9.571E-03	REL.HUMID.1 (Percent) 85.25	SPEC.HUMID.1 (Kg/Kg) 7.773E-03	VAP.PRES.1 (Millibar) 12.631	S.VAP.PRES.1 (Millibar) 14.817	REF.INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 13.008	VIR.TEMP.2 (Celsius) 14.278	V.POT.TEMP.2 (Celsius) 14.368	ABS.HUMID.2 (Kg/m3) 9.634E-03	REL.HUMID.2 (Percent) 85.15	SPEC.HUMID.2 (Kg/Kg) 7.819E-03	VAP.PRES.2 (Millibar) 12.719	S.VAP.PRES.2 (Millibar) 14.937	REF.INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041530  
START TIME: 15:31:40 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.019 AT GMH	MOMENTUM FLUX (Nt/m2) -1.39E-01	FRICTION VELOCITY (Meters/sec) 3.362E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2)) (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(N1-Z1-PS1)-(N2-Z2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.571E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.99E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 1.19E 00
Z/L AT GMH -0.024	LAT. HEAT FLUX (Watts/m2) 6.72E 01	SCALING POT. TEMP. (Kelvin) -1.446E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = -8.23E 03
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 6.06E 00	ROUGHNESS LENGTH (Meters) 1.214E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.96E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = -3.74E 01
Z/L AT Z1 -0.034	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.030E 03		
Z/L AT Z2 -0.017	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.18E 02			
MUNIN-BRIKHOFV LENGTH (Meters) -5.450E 02	BOWEN RATIO (no units) 0.090			
PS11 AT Z1 = 0.110212 PS11 AT Z2 = 0.058847 PS12 AT Z1 = 0.063633 PS12 AT Z2 = 0.035986				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92F-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2318

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SM2 = +/- .08F-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.416E 02  
WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9004E 05

RUN NUMBER: 7905041530  
 START TIME: 15:31:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.905	7.87	10.47	NO DATA	1016.47	13.761	-0.856	-0.758	0.503	0.601

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	13.803	14.264	14.362	9.626E-03	85.16	7.813E-03	12.709	14.923	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.058 AT GMH	MOMENTUM FLUX (Nt/m2) -8.77E-02	FRICTION VELOCITY (Meters/sec) 2.667E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.114E-02	AIR DENSITY (Kg/m3) 1.2326
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.39E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.285E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.394E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH -0.070	LAT.HEAT FLUX (Watts/m2) 5.91E 01	SCALING POT.TEMP. (Kelvin) -2.806E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.485E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9002E 05
Z/L AT 10 METERS -0.054	SEN.HEAT FLUX (Watts/m2) 9.33E 00	ROUGHNESS LENGTH (Meters) 5.176E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.799
MONIN-OBUKHOV LENGTH (Meters) -1.851E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.149E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.193E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.23E 02			BAR.PRES.AT WT LEVEL (Millibar) 1017.67
	BOWEN RATIO (no units) 0.158			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
130%	130%	99%	157%	102%	5%	19%	259%	49%	107%	53%	69%	99%
196%	196%	46%	45%	124%	5%	7%	169%	23%	68%	147%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041530  
 START TIME: 15:31:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.034 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.04E-01 [6.0E-02]	FRICTION VELOCITY (Meter/sec) 2.888E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.47E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.007E-05 [3.0E-05]
Z/L AT GMH -0.042 [0.02]	LAT.HEAT FLUX (Watts/m2) 6.10E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.805E-02 [2.0E-02]
Z/L AT 10 METERS -0.033 [0.02]	SEN.HEAT FLUX (Watts/m2) 7.54E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.840E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.072E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 02 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.405E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.21E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.131 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
59%	56%	26%	8%	22%	0%	1%	26%	13%	5%	38%	46%	34%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041600  
START TIME: 16: 2: 0 PST  
END TIME: 16:32:10 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.135	5.156	4.570	4.389	5.022	3.082	5.058
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.168	3.837	2.512	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128356	1421 129086	0.183	75	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.436	8.80	10.35	NO DATA	317.0	1015.25	-4.30E 02	13.806	286.042
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.927	8.22	10.41	NO DATA	0.21	1016.35			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.015	14.182	14.362	9.534E-03	84.81	7.746E-03	12.584	14.838	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.019	14.282	14.372	9.584E-03	84.67	7.780E-03	12.654	14.945	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041600  
START TIME: 16: 2: 0 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.007 AT GMH	MOMENTUM FLUX (Nt/m2) -1.52E-01	FRICTION VELOCITY (Meters/sec) 3.510E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1*Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.392E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 6.55E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.14E 00
Z/L AT GMH -0.009	LAT. HEAT FLUX (Watts/m2) 6.84E 01	SCALING POT. TEMP. (Kelvin) -6.392E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.46E 03
Z/L AT 10 METERS -0.007	SFN. HEAT FLUX (Watts/m2) 2.80E 00	ROUGHNESS LENGTH (Meters) 1.426E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.46E 01
Z/L AT Z1 -0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.30E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.471E 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.007	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.59E 02			
MONIN OBUKHOV LENGTH (Meters) -1.391E 03	ROMEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.046686 PSI1 AT Z2 = 0.024072 PSI2 AT 7 = 0.028444 PSI2 AT Z2 = 0.014561				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2315
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9893E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- .08E-3 Kg/Kg.  
PTK1-PTK2 = +/- .088 Kel.

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905041600  
 START TIME: 16: 2: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.917	8.29	10.40	NO DATA	1016.26	13.806	-0.889	-0.791	0.464	0.562

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	13.015	14.270	14.368	9.578E-03	84.69	7.776E-03	12.646	14.932	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.051 AT GMH	MOMENTUM FLUX (Nt/m2) -9.95E-02	FRICTION VELOCITY (Meters/sec) 2.843E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.080E-02	AIR DENSITY (Kg/m3) 1.2318
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.61E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.447E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.607E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.862	LAT.HEAT FLUX (Watts/m2) 6.44E 01	SCALING POT.TEMP. (Kelvin) -2.824E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.027E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9001E 05
Z/L AT 10 METERS -0.848	SEN.HEAT FLUX (Watts/m2) 1.00E 01	ROUGHNESS LENGTH (Meters) 6.584E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.842
MONIN-OBUKHOV LENGTH (Meters) -2.089E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.30E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.177E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.196E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.55E 02			BAR.PRES.AT WT LEVEL (Millibar) 1017.46
	BOWEN RATIO (no units) 0.155			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
181%	181%	100%	160%	160%	5%	22%	319%	50%	109%	109%	70%	100%
193%	193%	46%	45%	121%	5%	8%	166%	23%	68%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041600  
 START TIME: 16: 2: 0 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.028 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.16E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.055E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.64E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.044E-05 [3.0E-05]
Z/L AT GMH -0.035 [0.02]	LAT.HEAT FLUX (Watts/m2) 6.53E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.582E-02 [2.0E-02]
Z/L AT 10 METERS -0.027 [0.02]	SEN.HEAT FLUX (Watts/m2) 6.89F 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 9.583E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.722E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.30E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.404E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.56E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.116 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
78%	76%	24%	4%	53%	0%	1%	52%	12%	8%	55%	42%	31%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041630  
START TIME: 16:32:20 PST  
END TIME: 17:23:30 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.130	5.148	4.523	4.345	5.008	2.303	5.100
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. T. REF. B		
4.168	3.860	2.513	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128443	1421 129208	0.183	71	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >SV)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	NEAR AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.844	8.71	10.31	NO DATA	318.4	1015.04	-3.21E 02	13.806	286.043
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.921	8.14	10.36	NO DATA	0.26	1016.14			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.024	14.188	14.368	9.511E-03	84.57	7.728E-03	12.553	14.843	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.011	14.270	14.360	9.552E-03	84.45	7.756E-03	12.611	14.934	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041630  
START TIME: 16:32:20 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (SINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.012 AT GMM	MOMENTUM FLUX (Nt/m2) -1.18E-01	FRICTION VELOCITY (Meters/sec) 3.091E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[Ln(Z1/Z2)] (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.15E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.637E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.44E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.29E 00
Z/L AT GMM 0.017	LAT. HEAT FLUX (Watts/m2) 5.30E 01	SCALING POT. TEMP. (Kelvin) 9.258E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.59E 03
Z/L AT 10 METERS 0.013	SEN. HEAT FLUX (Watts/m2) -3.56E 00	ROUGHNESS LENGTH (Meters) 8.962E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.46E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 5.84E 01
Z/L AT Z1 0.024	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.54E-05		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.72E 02			
MONIN-ORUKHNOV LENGTH (Meters) 7.578E 02	BOWEN RATIO (no units) -0.067			
PSI1 AT Z1= -0.113809 PSI1 AT Z2= -0.057860 PSI2 AT Z1= -0.153797 PSI2 AT Z2= -0.077108				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2312

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/Kcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(J/Kcal./Kg)  
5.9003E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905041630  
 START TIME: 16:32:20 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.912	8.21	10.36	NO DATA	1016.04	13.806	-0.894	-0.796	0.454	0.552

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.010	14.260	14.358	9.548E-03	84.46	7.752E-03	12.685	14.923	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.053 AT 10M	MOMENTUM FLUX (Nt/m2) -9.71E-02	FRICTION VELOCITY (Meters/sec) 2.808E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.887E-02	AIR DENSITY (Kg/m3) 1.2315
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.61E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.554E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.613E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT 10M -0.064	LAT. HEAT FLUX (Watts/m2) 6.45E 01	SCALING POT. TEMP. (Kelvin) -2.853E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.012E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9001E 05
Z/L AT 10 METERS -0.050	SEN. HEAT FLUX (Watts/m2) 9.98E 00	ROUGHNESS LENGTH (Meters) 6.293E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.839
MONIN-OBUKHOV LENGTH (Meters) -2.018E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.172E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.196E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.47E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.24
	BOWEN RATIO (no units) 0.155			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
143%	160%	99%	158%	119%	5%	23%	277%	50%	109%	70%	70%	99%
193%	193%	46%	45%	121%	5%	9%	165%	23%	68%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041630  
 START TIME: 16:32:20 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.016 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.04E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.898E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.51E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.819E-05 [3.0E-05]
Z/L AT 10M -0.020 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.45E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.063E-03 [2.0E-02]
Z/L AT 10 METERS -0.015 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.16E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.313E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -6.562E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.21E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.282E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.54E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.072 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
165%	158%	11%	11%	214%	0%	5%	143%	5%	14%	100%	19%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041700  
START TIME: 17:24:00 PST  
END TIME: 17:32:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOIT.RFF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	5.140	5.155	4.307	4.175	4.998	1.519	5.045

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.151	3.829	2.516	0.001	0.001	0.001	0.001	6.285

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126739	1421 127637	0.183	89	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.674	8.30	10.37	NO DATA	316.5	1014.89	-2.12E 02	13.790	285.879

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.764	7.82	10.40	NO DATA	0.29	1015.99

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.854	14.022	14.202	9.553E-03	85.87	7.759E-03	12.602	14.676	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.29	12.854	14.115	14.206	9.580E-03	85.53	7.775E-03	12.641	14.779	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041700  
START TIME: 17:24:00 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.011 AT GMH	MOMENTUM FLUX (Nt/m2) -1.03E-01	FRICTION VELOCITY (Meters/sec) 2.892E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1*Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.453E-05	$N = WIND SPEED (M/sec)$ $Z = HEIGHT (Meters)$ $DWS/DZ = 5.30E-02$	$N = WIND SPEED (M/sec)$ $Z = HEIGHT (M) Vert. Axis$ $PS1 = PS11$ $WS SLOPE = 1.38E 00$
Z/L AT GMH -0.014	LAT. HEAT FLUX (Watts/m2) 5.64E 01	SCALING POT. TEMP. (Kelvin) -6.453E-03	$N = SPEC. HUMIDITY (Kg/Kg)$ $Z = HEIGHT (Meters)$ $DSH/DZ = -8.92E-06$	$N = SPEC. HUMIDITY (Kg/Kg)$ $Z = HEIGHT (M) Vert. Axis$ $PS1 = PS12$ $SH SLOPE = -8.38E 03$
Z/L AT 10 METERS -0.011	SFN. HEAT FLUX (Watts/m2) 2.33E 00	ROUGHNESS LENGTH (Meters) 7.019E-05	$N = POT. TEMP. (Kelvin)$ $Z = HEIGHT (Meters)$ $DPT/DZ = -8.92E-04$	$N = POT. TEMP. (Kelvin)$ $Z = HEIGHT (M) Vert. Axis$ $PS1 = PS12$ $PTK SLOPE = -8.38E 01$
Z/L AT Z1 -0.020	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.12E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.519E-03		$N = Ln TEMP. STRUC. (Kelvin-2/3)$ $Z = HEIGHT (M) Vert. Axis$ $PS1 = NONE$ $CT2 SLOPE = NO DATA$
Z/L AT Z2 -0.010	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.53E 02			
ROUGHNESS LENGTH (Meters) -9.212E 02	BOWEN RATIO (no units) 0.041			
PS11 AT Z1 = 0.068608 PS11 AT Z2 = 0.035819 PS12 AT Z1 = 0.042075 PS12 AT Z2 = 0.021749				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2317

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4169E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9012E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905041700  
 START TIME: 17: 2:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.753	7.88	10.40	NO DATA	1015.89	13.790	-1.037	-0.93v	0.314	0.412

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.051	14.104	14.202	9.577E-03	85.57	7.773E-03	12.637	14.767	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.06v AT 6M	MOMENTUM FLUX (Nt/m2) -8.80E-02	FRICTION VELOCITY (Meters/sec) 2.672E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.142E-02	AIR DENSITY (Kg/m3) 1.2320
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.59	HUMIDITY FLUX (Kg/sec m2) 2.46E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.484E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.464E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.416E 02
Z/L AT 6M -0.06v	LAT. HEAT FLUX (Watts/m2) 6.09E 01	SCALING POT. TEMP. (Kelvin) -3.295E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 0.807E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9010E 05
Z/L AT 10 METERS 0.063	SEN. HEAT FLUX (Watts/m2) 1.10E 01	ROUGHNESS LENGTH (Meters) 5.214E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.820
MONTIN OBUKHOV LENGTH (Meters) -1.581E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.12E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.150E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.195E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.40E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.09
	BOWEN RATIO (no units) 0.180			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
195%	195%	116%	168%	168%	5%	36%	337%	58%	110%	110%	78%	116%
103%	103%	46%	45%	111%	5%	11%	156%	23%	68%	134%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041700  
 START TIME: 17: 2:40 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.041 (0.02) AT 6M	MOMENTUM FLUX (Nt/m2) -9.23E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.735E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.43E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.092E-05 (3.0E-05)
Z/L AT 6M 0.049 (0.02)	LAT. HEAT FLUX (Watts/m2) 6.00E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.841E-02 (2.0E-02)
Z/L AT 10 METERS -0.030 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.54E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.856E-05 (6.0E-05)
MONTIN OBUKHOV LENGTH (Meters) -2.642E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.12E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.245E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.41E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.136 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
21%	69%	9%	4%	59%	0%	5%	55%	4%	7%	67%	16%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905041730  
START TIME: 17:32:50 PST  
END TIME: 18: 3: 0 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUC. 1 0.001	No. 02 TEMP. STRUC. 2 0.001	No. 03 DEW POINT 1 5.138	No. 04 DEW POINT 2 5.152	No. 05 WIND SPEED 1 4.095	No. 06 WIND SPEED 2 3.950	No. 07 BAR. PRES. 1 4.998	No. 08 SKY RAD. 0.774	No. 09 WIND DIR. 5.002
No. 10 BULK WT TEMP 4.095	No. 11 AC FREQUENCY 3.835	No. 12 AC VOLTAGE 2.515	No. 13 MANUAL FLAG 0.901	No. 14 ZERO REF. 0.901	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 124059	No. 2 AIR TEMP. 2 1421 125145	UPWIND NEAR HEIGHT/LENGTH PATH (Meters) 0.183	UPWIND FAN HEIGHT/LENGTH PATH (Meters) 88	OFFICAL (Volts) 0.009	OFFICAL (Volts) 0.000	WIND LAL (Volts) 0.000	WIND LAL (Volts) 0.992	WIND LAL (Volts) 0.992
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC FREQ. FLUX (No. scans) 0	AC VOLTAGE (VAC) 115.2	AC FREQUENCY (Hz) 59.84
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 12.406	WIND SPEED 1 (Meter/sec) 7.89	DEW POINT 1 (Celsius) 10.36	TEMP. STRUC. 1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 315.1	BAR. PRES. 1 (Millibar) 1014.88	SKY RAD. (Millibar) -1.00E-02	BULK WT TEMP (Celsius) 13.735	MEAN AIR TEMP (Celsius) 13.620
AIR TEMP. 2 (Celsius) 12.514	WIND SPEED 2 (Meter/sec) 7.41	DEW POINT 2 (Celsius) 10.41	TEMP. STRUC. 2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.30	BAR. PRES. 2 (Millibar) 1015.98			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 12.586	VIR. TEMP. 1 (Celsius) 13.752	V. POT. TEMP. 1 (Celsius) 13.932	ARS. HUMID. 1 (Kg/m3) 9.554E-03	REL. HUMID. 1 (Percent) 87.32	SPEC. HUMID. 1 (Kg/Kg) 7.753E-03	VAP. PRES. 1 (Millibar) 12.592	S. VAP. PRES. 1 (Millibar) 14.420	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 12.405	VIR. TEMP. 2 (Celsius) 13.864	V. POT. TEMP. 2 (Celsius) 13.956	ARS. HUMID. 2 (Kg/m3) 9.596E-03	REL. HUMID. 2 (Percent) 87.02	SPEC. HUMID. 2 (Kg/Kg) 7.781E-03	VAP. PRES. 2 (Millibar) 12.651	S. VAP. PRES. 2 (Millibar) 14.539	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041730  
START TIME: 17:32:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 AT 6M	MOMENTUM FLUX (Nt/m2) -1.17E-01	FRICTION VELOCITY (Meters/sec) 0.078E-01	GENERAL FORM: $DN/DZ = \frac{1}{(N1-N2)} \cdot \frac{1}{(Z1-Z2)}$	GENERAL FORM: $N/SLOPE = \frac{1}{(N1-N2)} \cdot \frac{1}{(Z1-Z2)}$
GEOMETRIC MEAN HEIGHT (Meters) $G = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.53E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.650E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DWS/DZ = 5.37E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.30E-00
Z/L AT 6M -0.031	LAT. HEAT FLUX (Watts/m2) 6.24E-01	SCALING POT. TEMP. (Kelvin) 1.576E-02	N=SPEC HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DCH/DZ = -8.92E-06$	N=SPEC HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.11E-03
Z/L AT 10 METERS -0.024	SEN. HEAT FLUX (Watts/m2) 6.05E-00	ROUGHNESS LENGTH (Meters) 8.826E-05	N=POT TEMP (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -2.11E-03$	N=POT TEMP (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.43E-01
Z/L AT Z1 -0.044	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.08E-02	DRAG COEF. AT 10 METERS (Dimensionless) 1.976E-03		N=LNTMP STRUC (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.022	TOTAL HEAT RUDGET FLUX (Watts/m2) -3.95E-01			
MONIN-OBUKHOV LENGTH (Meters) -4.125E-02	BOWEN RATIO (no unit) 0.097			
PSI1 AT Z1 = 0.140358 PSI1 AT Z2 = 0.076106 PSI2 AT Z1 = 0.087716 PSI2 AT Z2 = 0.046774				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7979	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2328

AIR SPECIFIC HEAT  
(J/Kg K)  
2.4181E-02

WATER LAT. HEAT CAP  
(J/Kg K)  
5.982E-05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2: +/- 0.01 K/Kg

RUN NUMBER: 7905041730  
 START TIME: 17:32:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.501	7.47	10.41	NO DATA	1015.89	13.735	-1.233	-1.135	0.118	0.216

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.599	13.852	13.950	9.591E-03	87.05	7.778E-03	12.644	14.525	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.095 AT GHM	MOMENTUM FLUX (Nt/m2) -7.72E-02	FRICTION VELOCITY (Meters/sec) 2.503E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.264E-02	AIR DENSITY (Kg/m3) 1.2331
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.28E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.393E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.282E-05	AIR SPECIFIC HEAT (ITcal./Kg Kell.) 2.4168E 02
Z/L AT GHM -0.111	LAT. HEAT FLUX (Watts/m2) 5.64E 01	SCALING POT. TEMP. (Kelvin) -3.916E-02	WITH POT. TEMPERATURE (Meter Kell./sec) 9.800E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.086	SEN. HEAT FLUX (Watts/m2) 1.22E 01	ROUGHNESS LENGTH (Meters) 4.042E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.763
MONIN-OBUKHOV LENGTH (Meters) -1.166E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.08E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.123E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.93E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.89
	BOWEN RATIO (no units) 0.217			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
131%	131%	104%	160%	102%	6%	57%	262%	52%	108%	50%	72%	104%
174%	174%	46%	45%	102%	6%	16%	147%	23%	68%	125%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041730  
 START TIME: 17:32:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.055 (0.02) AT GHM	MOMENTUM FLUX (Nt/m2) -8.94E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.679E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.34E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.107E-05 (3.0E-05)
Z/L AT GHM -0.066 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.77E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.243E-02 (2.0E-02)
Z/L AT 10 METERS -0.051 (0.02)	SEN. HEAT FLUX (Watts/m2) 9.14E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.830E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.973E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.08E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.344E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.94E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.174 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
64%	61%	24%	6%	34%	8%	8%	36%	12%	5%	57%	41%	31%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041800  
START TIME: 18: 3:10 PST  
END TIME: 18:33:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.131	5.147	3.904	3.780	5.000	0.197	4.924
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.027	3.843	2.511	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122353	1421 123423	0.183	89	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >SV)	(No. >Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.235	7.52	10.32	NO DATA	312.4	1014.91	-2.74E 01	13.668	285.449
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.342	7.10	10.36	NO DATA	0.30	1016.01			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.415	13.577	13.757	9.534E-03	88.06	7.731E-03	12.557	14.260	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.432	13.688	13.778	9.565E-03	87.67	7.752E-03	12.603	14.376	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041800  
START TIME: 18: 3:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.029 AT GHM	MOMENTUM FLUX (Nt/m2) -9.33E-02	FRICTION VELOCITY (Meters/sec) 2.751E-01	GENERAL FORM: $DN/DZ = \frac{(N1-N2)/(Ln(Z1/Z2))}{(Z1+Z2)/2}$	GENERAL FORM: $'N' SLOPE = \frac{(LnZ1-PSI)-(LnZ2-PSI)}{(N1-N2)}$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.28E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.713E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.74E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.45F 00
Z/L AT GHM -0.037	LAT. HEAT FLUX (Watts/m2) 5.63E 01	SCALING POT. TEMP. (Kelvin) -1.448E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.05E 03
Z/L AT 10 METERS -0.024	SEN. HEAT FLUX (Watts/m2) 4.97E 00	ROUGHNESS LENGTH (Meters) 5.818E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.92E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.73E 01
Z/L AT Z1 -0.037	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.713E-03		
Z/L AT Z2 -0.026	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.39E 01			
MONIN-ORUKHOV LENGTH (Meters) -3.549E 02	ROFEN RATIO (no units) 0.088			
PSI1 AT Z1= 0.159419 PSI1 AT Z2= 0.087255 PSI2 AT Z1= 0.100049 PSI2 AT Z2= 0.053793				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by interpolation of:

SH1 SH2 +/- .001 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2336

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9836E 03



RUN NUMBER: 7905041800  
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MARINE SURFACE LAYER  
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PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.329	7.15	10.35	NO DATA	1015.91	13.668	-1.339	-1.241	0.006	0.104

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.427	13.674	13.772	9.542E-03	87.72	7.749E-03	12.598	14.362	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.117 AT GMH	MOMENTUM FLUX (Nt/m2) -6.95E-02	FRICTION VELOCITY (Meters/sec) 2.374E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.635E-02	AIR DENSITY (Kg/m3) 1.2339
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.397E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.167E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMH -0.135	LAT. HEAT FLUX (Watts/m2) 5.36E 01	SCALING POT. TEMP. (Kelvin) -4.281E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.016E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9034E 05
Z/L AT 10 METERS -0.104	SEN. HEAT FLUX (Watts/m2) 1.27E 01	ROUGHNESS LENGTH (Meters) 3.269E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.695
MONIN-OBUKHOV LENGTH (Meters) -9.590E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.102E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.88E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.11
	BOWEN RATIO (no units) 0.237			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGT	DRAW COEF.
143%	143%	113%	165%	111%	8%	105%	276%	57%	108%	55%	77%	113%
178%	170%	46%	45%	98%	8%	29%	144%	23%	68%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041800  
 START TIME: 18: 3:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.069 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -7.64E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.483E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.19E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.132E-05 (3.0E-05)
Z/L AT GMH -0.082 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.41E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.330E-02 (2.0E-02)
Z/L AT 10 METERS -0.063 (0.02)	SEN. HEAT FLUX (Watts/m2) 9.07E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.186E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.591E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.74E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.262E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.77E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.186 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
64%	61%	17%	3%	43%	0%	8%	42%	8%	5%	65%	22%	27%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041830  
START TIME: 18:33:30 PST  
END TIME: 19: 3:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.143	5.160	3.759	3.623	4.999	-0.070	4.939
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.955	3.820	2.508	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124068	1421 125019	0.183	91	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.407	7.25	10.39	NO DATA	312.9	1014.90	9.82E 00	13.598	285.614
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)			
12.502	6.81	10.44	NO DATA	0.27	1016.00			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	12.587	13.756	13.935	9.574E-03	87.49	7.769E-03	12.617	14.421	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	12.592	13.855	13.946	9.611E-03	87.22	7.793E-03	12.671	14.527	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041830  
START TIME: 18:33:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.813 AT GMM	MOMENTUM FLUX (Nt/m2) -8.79F-02	FRICTION VELOCITY (Meters/sec) 2.671E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2)) (Z1=Z2)1/21	GENERAL FORM: 'N' SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.14E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.486E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.86E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 1.50E 00
Z/L AT GMM -0.817	LAT.HEAT FLUX (Watts/m2) 5.29E 01	SCALING POT. TEMP. (Kelvin) -6.486E-03	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -8.33E 03
Z/L AT Z1 -0.824	SEN.HEAT FLUX (Watts/m2) 2.16E 00	ROUGHNESS LENGTH (Meters) 3.201E-05	N=POT.TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT.TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -8.33E 01
Z/L AT Z2 -0.812	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.82E 00	DRAW COEF. AT 10 METERS (Dimensionless) 1.759E-03		N=LnTEMP.STRUC. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -7.767E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.48E 01			
PS11 AT Z1= 0.080216 PS11 AT Z2= 0.042148 PS12 AT Z1= 0.049357 PS12 AT Z2= 0.025643	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SFN HEAT TRANSF.COEF.	BULK MOISTURE TRANSF.COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTE:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00F-3 Kg/Kg.  
PTK1-PTK2= +/- .000 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2329

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4168E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9827E 03

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905041830  
 START TIME: 18:33:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U.POT-WT TEMP (Kelvin)
12.490	6.86	10.43	NO DATA	1015.90	13.598	-1.108	-1.010	0.245	0.343

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U.POT. TEMP. (Celsius)	AUS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.588	13.843	13.941	9.607E-03	87.25	7.790E-03	12.665	14.515	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.112 AT GMH	MOMENTUM FLUX (Nt/m2) -6.29E-02	FRICTION VELOCITY (Meters/sec) 2.259E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.103E-02	AIR DENSITY (Kg/m3) 1.2332
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.99E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.153E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.993E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4168E 02
Z/L AT GMH -0.130	LAT. HEAT FLUX (Watts/m2) 4.92E 01	SCALING POT. TEMP. (Kelvin) -3.708E-02	WITH POT. TEMPERATURE (Meter Kelvin./sec) 8.377E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9825E 05
Z/L AT 10 METERS -0.100	SEN. HEAT FLUX (Watts/m2) 1.05E 01	ROUGHNESS LENGTH (Meters) 2.665E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.624
MONIN-OBUKHOV LENGTH (Meters) -1.003E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.82E 00	DRAG COEF. AT 10 METERS (Dimensionless) 1.083E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.95E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.10
	BOWEN RATIO (no units) 0.212			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
190%	190%	111%	166%	166%	12%	135%	332%	56%	110%	110%	76%	111%
180%	180%	46%	46%	108%	12%	37%	154%	23%	69%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041830  
 START TIME: 18:33:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.064 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -7.03E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.380E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.02E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.896E-05 [3.0E-05]
Z/L AT GMH -0.075 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.00E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.050E-02 [2.0E-02]
Z/L AT 10 METERS -0.058 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.19E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.585E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.738E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.82E 00 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.262E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.82E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.158 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
78%	75%	19%	4%	59%	8%	4%	58%	9%	5%	75%	22%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905041900  
START TIME: 19: 3:50 PST  
END TIME: 19:34: 0 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.173	5.190	3.758	3.634	5.004	-0.097	5.014

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.896	3.825	2.508	0.001	0.001	0.001	0.001	6.205

## \* DILUTED CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	FAITH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125044	1421 125948	0.183	93	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. ) .005V	B(No. ) .005V	(No. ) .002V	(No. ) 5V	(No. ) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.504	7.25	10.57	NO DATA	315.5	1014.97	1.35E 01	13.541	285.710

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
12.595	6.83	10.61	NO DATA	0.23	1016.07

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.684	13.870	14.050	9.687E-03	87.98	7.843E-03	12.771	14.515	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.685	13.965	14.055	9.721E-03	87.70	7.885E-03	12.819	14.617	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905041900  
START TIME: 19: 3:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.014 AT GMH	MOMENTUM FLUX (Nt/m2) -8.05E-02	FRICTION VELOCITY (Meters/sec) 2.556E-01	GENERAL FORM: DN/DZ = [(N1-N2)/Ln(Z1/Z2)] (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.05E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.506E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.62E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.57E 00
Z/L AT GMH -0.018	LAT. HEAT FLUX (Watts/m2) 5.04E 01	SCALING POT. TEMP. (Kelvin) -6.506E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.31E 03
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m2) 2.07E 00	ROUGHNESS LENGTH (Meters) 4.389E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.31E 01
Z/L AT Z1 -0.026	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.612E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.013	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.62E 01			
MONIN-ORUKHOV LENGTH (Meters) -7.071E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.087350 PSI1 AT Z2 = 0.046075 PSI2 AT Z1 = 0.053853 PSI2 AT Z2 = 0.028067				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.  
PTK1-PTK2 = +/- .00E Kel.

## MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2325	2.4170E 02	5.9022E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905041900  
 START TIME: 19: 3:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.584	6.88	10.61	NO DATA	1015.97	13.541	-0.957	-0.859	0.412	0.510

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.682	13.953	14.051	9.717E-03	87.74	7.882E-03	12.814	14.605	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.098 AT GMH	MOMENTUM FLUX (Nt/m2) -6.33E-02	FRICTION VELOCITY (Meters/sec) 2.266E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.134E-02	AIR DENSITY (Kg/m3) 1.2328
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.86E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.661E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.861E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4170E 02
Z/L AT GMH -0.114	LAT. HEAT FLUX (Watts/m2) 4.60E 01	SCALING POT. TEMP. (Kelvin) -3.284E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.441E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9020E 05
Z/L AT 10 METERS -0.088	SFN. HEAT FLUX (Watts/m2) 9.28E 00	ROUGHNESS LENGTH (Meters) 2.698E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.567
MONIN-OBUKHOV LENGTH (Meters) -1.140E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.084E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.87E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.17
	BOWEN RATIO (no units) 0.202			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
195%	195%	116%	169%	169%	10%	129%	338%	58%	111%	111%	78%	116%
188%	188%	46%	48%	116%	10%	36%	164%	23%	71%	139%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041900  
 START TIME: 19: 3:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.057 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -6.82E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.348E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.90E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.601E-05 [3.0E-05]
Z/L AT GMH -0.067 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.70E 01 [2.6E+01]	SCALING POT. TEMP. (Kelvin) -1.817E-02 [2.0E-02]
Z/L AT 10 METERS -0.052 [0.02]	SFN. HEAT FLUX (Watts/m2) 6.34E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.298E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.938E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.219E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.82E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.149 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
74%	71%	14%	6%	58%	0%	2%	57%	7%	1%	66%	15%	24%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905041930  
START TIME: 19:34:10 PST  
END TIME: 20:4:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.295	0.000	0.001	5.189	5.206	3.511	3.399	5.015	-0.097	4.949
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.850	3.836	2.508	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125497	1421 126362	0.183	97	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >SV)	(No. >Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.550	6.77	10.67	NO DATA	313.3	1015.14	1.35E 01	13.496	285.753
ATR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.636	6.40	10.71	NO DATA	0.18	1016.23			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.730	13.924	14.104	9.749E-03	88.28	7.914E-03	12.855	14.561	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.726	14.015	14.105	9.785E-03	88.04	7.937E-03	12.905	14.659	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905041930  
START TIME: 19:34:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.018 AT GHM	MOMENTUM FLUX (Nt/m2) -6.61E-02	FRICTION VELOCITY (Meters/sec) 2.316E-01	GENERAL FORM: $DN/DZ = \frac{1}{(N1-N2)} \cdot \frac{1}{(Ln(Z1/Z2))}$	GENERAL FORM: $N'SLOPE = \frac{1}{(Ln(Z1-PS1) - (Ln(Z2-PS1)))} \cdot (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.87E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.559E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.14E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.73E 00
Z/L AT GHM -0.023	LAT. HEAT FLUX (Watts/m2) 4.63E 01	SCALING POT. TEMP. (Kelvin) -6.559E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.24E 03
Z/L AT Z1 -0.032	SEN. HEAT FLUX (Watts/m2) 1.89E 00	ROUGHNESS LENGTH (Meters) 2.953E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.24E 01
Z/L AT Z2 -0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.544E-03		N=Ln TEMP. STRUC. (K x M-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -5.708E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.17E 01			
PS11 AT Z1 = 0.185792 PS11 AT Z2 = 0.056376 PS12 AT Z1 = 0.065546 PS12 AT Z2 = 0.034437	ROMEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2325

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9019E 05

RUN NUMBER: 7905041930  
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MARINE SURFACE LAYER  
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PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.626	6.45	10.70	NO DATA	1016.14	13.496	-0.870	-0.772	0.588	0.606

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABB.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M-2/3)
10.00	12.724	14.004	14.182	9.781E-03	88.07	7.934E-03	12.900	14.648	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.110 AT GNM	MOMENTUM FLUX (Nt/m2) -5.40E-02	FRICTION VELOCITY (Meters/sec) 2.094E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.384E-02	AIR DENSITY (Kg/m3) 1.2328
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.66E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.441E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.662E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4171E 02
Z/L AT GNM -0.128	LAT.HEAT FLUX (Watts/m2) 4.11E 01	SCALING POT.TEMP. (Kelvin) -3.143E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 6.581E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9017E 05
Z/L AT 10 METERS -0.098	SFN.HEAT FLUX (Watts/m2) 8.21E 00	ROUGHNESS LENGTH (Meters) 1.921E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.524
MONIN-OBUKHOV LENGTH (Meters) -1.017E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.055E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.28E 01			BAR.PRES.AT WT LEVEL (Millibar) 1017.34
	BOWEN RATIO (no units) 0.200			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
199%	199%	122%	172%	172%	10%	129%	344%	61%	111%	111%	81%	122%
195%	195%	46%	48%	123%	10%	36%	171%	23%	71%	146%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905041930  
 START TIME: 19:34:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.064 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -5.74E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.155E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.71E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -6.487E-05 [3.0E-05]
Z/L AT GNM -0.076 [0.02]	LAT.HEAT FLUX (Watts/m2) 4.22E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.732E-02 [2.0E-02]
Z/L AT 10 METERS -0.058 [0.02]	SFN.HEAT FLUX (Watts/m2) 5.58E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.279E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.713E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.176E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.26E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.147 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
72%	69%	11%	7%	57%	8%	1%	57%	6%	1%	63%	9%	23%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905042000  
START TIME: 20: 4:30 PST  
END TIME: 20 34:40 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.198	5.214	3.747	3.618	5.014	-0.097	4.959

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.825	3.831	2.505	0.001	0.901	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124347	1421 125294	0.183	101	-0.009	0.000	0.900	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.1	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.435	7.23	10.72	NO DATA	313.6	1015.13	1.35E 01	13.471	285.642

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.529	6.80	10.76	NO DATA	0.12	1016.23

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.614	13.814	13.993	9.786E-03	89.26	7.941E-03	12.899	14.451	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.620	13.912	14.002	9.819E-03	88.93	7.962E-03	12.946	14.557	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905042000  
START TIME: 20: 4:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR, WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.014 AT GMH	MOMENTUM FLUX (Nt/m2) -8.32E-02	FRICTION VELOCITY (Meters/sec) 2.598E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2)) (Z1*Z2)^(1/2)]	GENERAL FORM: N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.08E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.499E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 4.71E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 1.54E 00
Z/L AT GMH -0.018	LAT.HEAT FLUX (Watts/m2) 5.14E 01	SCALING POT. TEMP. (Kelvin) -6.499E-03	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -8.32E 03
Z/L AT 10 METERS -0.014	SEN.HEAT FLUX (Watts/m2) 2.11E 00	ROUGHNESS LENGTH (Meters) 4.674E-05	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -8.32E 01
Z/L AT Z1 -0.023	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.675E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.013	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.71E 01			
MONIN-OBUKHOV LENGTH (Meters) -7.320E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1= 0.084658 PSI1 AT Z2= 0.044590 PSI2 AT Z1= 0.052154 PSI2 AT Z2= 0.027158				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2329

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4172E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9025E 03

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905042000  
 START TIME: 20: 4:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.518	6.85	10.75	NO DATA	1016.13	13.471	-0.953	-0.855	0.429	0.527

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.616	13.980	13.998	9.815E-03	88.97	7.959E-03	12.941	14.544	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.098 AT 6MH	MOMENTUM FLUX (Nt/m2) -6.27E-02	FRICTION VELOCITY (Meters/sec) 2.255E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.085E-02	AIR DENSITY (Kg/m3) 1.2332
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.186E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.720E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4172E 02
Z/L AT 6MH -0.115	LAT. HEAT FLUX (Watts/m2) 4.25E 01	SCALING POT. TEMP. (Kelvin) -3.279E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.394E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9023E 05
Z/L AT 10 METERS -0.088	SEN. HEAT FLUX (Watts/m2) 9.23E 00	ROUGHNESS LENGTH (Meters) 2.644E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.499
MONIN-OBUKHOV LENGTH (Meters) -1.131E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.082E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.53E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.33
	BOWEN RATIO (no units) 0.217			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
193%	193%	114%	168%	168%	10%	129%	335%	57%	111%	111%	77%	114%
188%	188%	46%	49%	116%	10%	36%	165%	23%	72%	139%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042000  
 START TIME: 20: 4:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.057 (0.02) AT 6MH	MOMENTUM FLUX (Nt/m2) -6.86E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.353E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.80E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.309E-05 (3.0E-05)
Z/L AT 6MH -0.067 (0.02)	LAT. HEAT FLUX (Watts/m2) 4.45E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.812E-02 (2.0E-02)
Z/L AT 10 METERS -0.051 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.31E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.372E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.942E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.236E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.57E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.159 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
75%	73%	16%	11%	57%	0%	2%	59%	8%	3%	66%	18%	27%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905042030  
START TIME: 20:34:50 PST  
END TIME: 21: 5: 0 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.172	5.188	3.046	2.976	5.026	-0.098	4.883

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.801	3.842	2.505	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121991	1421 122954	0.183	105	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. ) .005V	B(No. ) .005V	(No. ) .002V	(No. ) 5V	(No. ) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.199	5.88	10.56	NO DATA	311.0	1015.31	1.36E 01	13.448	285.407

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
12.295	5.63	10.60	NO DATA	0.06	1016.40

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.379	13.563	13.743	9.697E-03	89.74	7.860E-03	12.770	14.231	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.386	13.663	13.753	9.730E-03	89.40	7.881E-03	12.818	14.337	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905042030  
START TIME: 20:34:50 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.038 AT GHM	MOMENTUM FLUX (M/m2) -3.50E-02	FRICTION VELOCITY (Meters/sec) 1.684E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1+Z2)/2$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.818E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 2.83E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 2.38E 00
Z/L AT GHM -0.047	LAT. HEAT FLUX (Watts/m2) 3.50E 01	SCALING POT. TEMP. (Kelvin) -6.818E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -7.93E 03
Z/L AT Z1 -0.066	SEN. HEAT FLUX (Watts/m2) 1.43E 00	ROUGHNESS LENGTH (Meters) 6.625E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -7.93E 01
Z/L AT Z2 -0.033	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.36E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.133E-03		N=Ln TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -2.775E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.01E 01			
PSI1 AT Z1= 0.195309 PSI1 AT Z2= 0.108724 PSI2 AT Z1= 0.123549 PSI2 AT Z2= 0.067414	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92F-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2342

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.  
PTK1-PTK2= +/- .08B Kel.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4170E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9039E 05

RUN NUMBER: 7905042030  
 START TIME: 20:34:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin <sup>2/3</sup> )	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.284	5.66	10.60	NO DATA	1016.31	13.448	-1.164	-1.066	0.203	0.301

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m <sup>3</sup> )	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin <sup>2/3</sup> )
10.00	12.382	13.651	13.749	9.726E-03	89.44	7.879E-03	12.813	14.325	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.209 AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -3.96E-02	FRICTION VELOCITY (Meters/sec) 1.792E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec <sup>2</sup> ) -3.211E-02	AIR DENSITY (Kg/m <sup>3</sup> ) 1.2345
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2) <sup>1/2</sup> 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.48E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.669E-05	WITH ABS. HUMIDITY (Meter Kg/sec m <sup>3</sup> ) 1.475E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4170E 02
Z/L AT GMM -0.234	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.65E 01	SCALING POT. TEMP. (Kelvin) -4.214E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.551E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9037E 05
Z/L AT 10 METERS -0.180	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 9.43E 00	ROUGHNESS LENGTH (Meters) 9.186E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.478
MONIN-OBUKHOV LENGTH (Meters) -5.552E 01	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.36E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.003E-03		ABS. HUMID. AT WT LEVEL (Kg/m <sup>3</sup> ) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 5.95E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.51
	BOWEN RATIO (no units) 0.259			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
227%	227%	155%	191%	191%	10%	134%	383%	77%	114%	114%	97%	155%
177%	177%	46%	48%	105%	10%	34%	153%	23%	71%	128%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042030  
 START TIME: 20:34:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.134 (0.02) AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -3.86E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.767E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2) <sup>1/2</sup> 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.46E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 6.726E-05 (3.0E-05)
Z/L AT GMM -0.152 (0.02)	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.62E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.346E-02 (2.0E-02)
Z/L AT 10 METERS -0.117 (0.02)	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 6.68E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 8.401E-06 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -8.548E 01	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.36E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.030E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 5.76E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.196 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
64%	62%	4%	2%	63%	0%	10%	60%	3%	1%	75%	2%	2

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905042100  
START TIME: 21: 5:10 PST  
END TIME: 21:35:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD	WIND DIR.
6.205	0.000	0.001	5.186	5.202	2.617	2.533	5.029	-0.098	5.041
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.781	3.833	2.504	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123691	1421 124558	0.183	109	-0.009	0.000	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

No. 1	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. x 0.05V)	B (No. x 0.05V)	(No. x 0.02V)	(No. x 5V)	(No. x 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.369	5.06	10.65	NO DATA	316.4	1015.36	1.37E 01	13.428	285.5/2
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
12.456	4.81	10.68	NO DATA	0.00	1016.45			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin x 2/3)
18.35	12.549	13.741	13.921	9.746E-03	89.24	7.905E-03	12.843	14.392	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin x 2/3)
9.20	12.546	13.832	13.922	9.777E-03	88.94	7.924E-03	12.887	14.490	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905042100  
START TIME: 21: 5:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.040 AT GHM	MOMENTUM FLUX (Nt/m2) -3.34E-02	FRICTION VELOCITY (Meters/sec) 1.644E-01	GENERAL FORM: DN/DZ = [(N1-N2)/Z] * [Ln(Z1/Z2)] (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(Ln Z1 - PSI1) - (Ln Z2 - PSI2)] / (N1 - N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.39E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.844E-05	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) DSH/DZ = 2.75E-02	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert Axis PSI=PSI1 WS SLOPE = 2.43E 00
Z/L AT GHM -0.049	LAT. HEAT FLUX (Watts/m2) 3.43E 01	SCALING POT. TEMP. (Kelvin) -6.844E-03	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) DSH/DZ = -8.92E-06	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE = 7.94E 03
Z/L AT 10 METERS -0.038	SEN. HEAT FLUX (Watts/m2) 1.40E 00	ROUGHNESS LENGTH (Meters) 5.816E-06	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) DPT/DZ = 8.92E-04	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert Axis PSI=PSI2 PTK SLOPE = -7.94E 01
Z/L AT Z1 -0.070	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.7 E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.549E-03		N= LAT. TEMP. SLOPE (K/M x 100) Z= HEIGHT (M) Vert Axis PSI=NONE CTD SLOPE=NO DATA
Z/L AT Z2 -0.035	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.94E 01			
MONIN-BRUKHOV LENGTH (Meters) 2.426E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1= 0.204203 PSI1 AT Z2= 0.114137 PSI2 AT Z1= 0.129408 PSI2 AT Z2= 0.070869				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.233

AIR SPECIFIC HEAT  
(J/Kg Kel)  
2.417E 02

WATER LAT. HEAT VAP.  
(J/Kg)  
5.9029E 05

RUN NUMBER: 7905042100  
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PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 12.445	WIND SPEED (Meter/sec) 4.84	DEW POINT (Celsius) 10.68	TEMP. STRUC. (KEL.M-2/3) NO DATA	BAR. PRES. (Millibar) 1016.36	BULK WT TEMP (Celsius) 13.428	AIR-WT TEMP (Kelvin) -0.983	POT-WT TEMP (Kelvin) -0.885	VIR-WT TEMP (Kelvin) 0.392	V.POT-WT TEMP (Kelvin) 0.490
HEIGHT (Meters) 10.00	POT. TEMP (Celsius) 12.543	VIR. TEMP (Celsius) 13.821	V.POT. TEMP. (Celsius) 13.919	ABS. HUMID. (Kg/m3) 9.774E-03	REL. HUMID. (Percent) 88.98	SPEC. HUMID. (Kg/Kg) 7.921E-03	VAP. PRES. (Millibars) 12.882	S.VAP. PRES. (Millibars) 14.479	REF. INDEX (KEL.M-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.289 AT GMH	MOMENTUM FLUX (Nt/m2) -2.74E-02	FRICTION VELOCITY (Meters/sec) 1.491E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.224E-02	AIR DENSITY (Kg/m3) 1.2338
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.22E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.648E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.223E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4171E 02
Z/L AT GMH -0.319	LAT. HEAT FLUX (Watts/m2) 3.02F 01	SCALING POT. TEMP. (Kelvin) -3.984E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.941E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E 05
Z/L AT 10 METERS 0.246	SEN. HEAT FLUX (Watts/m2) 7.42E 00	ROUGHNESS LENGTH (Meters) 3.276E-06		VAP. PRES. AT WT LEVEL (Millibars) 15.459
MUNIN-ORUKHOV LENGTH (Meters) -4.069E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 9.494E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.13E 01			BAR. PRES. AT WT LEVEL (Millibars) 1017.56
	BOWEN RATIO (no units) 0.245			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-"

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
212%	212%	138%	182%	182%	10%	127%	365%	69%	113%	113%	89%	138%
186%	186%	46%	49%	114%	10%	33%	163%	23%	72%	137%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042100  
 START TIME: 21: 5:10 PST  
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MARINE SURFACE LAYER  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.172 (0.021 AT GMH)	MOMENTUM FLUX (Nt/m2) -2.89F-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.529E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.26E-05 (8.0F-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.724F-05 (3.0E-05)
Z/L AT GMH -0.193 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.11E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.174E-02 (2.0E-02)
Z/L AT 10 METERS -0.149 (0.02)	SEN. HEAT FLUX (Watts/m2) 5.10F 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.102E-06 (6.0E-05)
MUNIN-ORUKHOV LENGTH (Meters) -6.732E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.084E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.09F 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.182 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
7%	70%	6%	8%	60%	0%	2%	60%	6%	1%	76%	2%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905042130  
START TIME: 21:35:30 PST  
END TIME: 22:54:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.200	5.214	2.644	2.564	5.014	-0.098	5.145

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.765	3.830	2.505	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124165	1421 125039	0.183	113	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.417	5.11	10.73	NO DATA	319.9	1015.12	1.37E 01	13.413	285.620

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.584	4.87	10.76	NO DATA	-0.05	1016.22

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.596	13.797	13.977	9.797E-03	89.46	7.950E-03	12.912	14.434	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.594	13.887	13.977	9.822E-03	89.11	7.964E-03	12.949	14.532	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905042130  
START TIME: 21:35:30 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.044 AT GMH	MOMENTUM FLUX (Nt/m2) -3.12E-02	FRICTION VELOCITY (Meters/sec) 1.592E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)* (Z1+Z2)1/2]	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.35E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.881E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.64E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 SH SLOPE = 2.51E 00
Z/L AT GMH -0.053	LAT. HEAT FLUX (Watts/m2) 3.34E 01	SCALING POT. TEMP. (Kelvin) -6.881E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.86E 03
Z/L AT 10 METERS -0.041	SEN. HEAT FLUX (Watts/m2) 1.37E 00	ROUGHNESS LENGTH (Meters) 4.841E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -7.86E 01
Z/L AT Z1 -0.075	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.417E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.038	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.84E 01			
MONIN-OBUKHOV LENGTH (Meters) -2.432E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.217119 PSI1 AT Z2 = 0.122061 PSI2 AT Z1 = 0.137943 PSI2 AT Z2 = 0.075942				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2330

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4172E 02

WATER LAT HEAT VAP  
(Jcal./Kg)  
5.9027E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

RUN NUMBER: 7905042130  
 START TIME: 21:35:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.493	4.98	10.76	NO DATA	1016.13	13.413	-0.920	-0.822	0.463	0.561

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.591	13.876	13.974	9.820E-03	89.15	7.962E-03	12.945	14.521	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.265 AT GMM	MOMENTUM FLUX (Nt/m2) -2.82E-02	FRICTION VELOCITY (Meters/sec) 1.513E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.289E-02	AIR DENSITY (Kg/m3) 1.2333
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.28E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.429E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.200E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4172E 02
Z/L AT GMM -0.294	LAT.HEAT FLUX (Watts/m2) 2.96E 01	SCALING POT.TEMP. (Kelvin) -3.770E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 5.704E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9025E 05
Z/L AT 10 METERS -0.226	SEN.HEAT FLUX (Watts/m2) 7.12E 00	ROUGHNESS LENGTH (Meters) 3.580E-06		VAP.PRES.AT WT LEVEL (Millibar) 15.440
MONIN-OBUKHOV LENGTH (Meters) -4.426E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF.AT 10 METERS (Dimensionless) 9.534E-04		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.04E 01			BAR.PRES.AT WT LEVEL (Millibar) 1017.33
	BOWEN RATIO (no units) 0.240			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
218%	218%	146%	187%	187%	10%	129%	373%	73%	114%	114%	93%	146%
191%	191%	46%	58%	119%	18%	34%	168%	23%	73%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042130  
 START TIME: 21:35:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.161 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -2.98E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.532E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.23E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -6.605E-05 [3.6E-05]
Z/L AT GMM -0.181 [0.02]	LAT.HEAT FLUX (Watts/m2) 3.04E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -2.060E-02 [2.0E-02]
Z/L AT 10 METERS -0.140 [0.02]	SEN.HEAT FLUX (Watts/m2) 4.88E 00 [7.0E+00]	ROUGHNESS LENGTH (Meters) 3.979E-06 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.161E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.853E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.00E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.178 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
69%	66%	3%	7%	60%	8%	2%	60%	3%	4%	75%	1%	25%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 790504200  
START TIME: 07:50 PST  
END TIME: 08:00 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg. True)	TEMP. STRUCT. 1 (Celsius)	TEMP. STRUCT. 2 (Celsius)	DEW POINT 1 (Celsius)	DEW POINT 2 (Celsius)	WIND SPEED 1 (Meters/Sec)	WIND SPEED 2 (Meters/Sec)	BAR. PRES. 2 (Millibar)	SKY RAD. (Celsius)	WIND DIR. (Deg. True)
314.6	10.00	10.01	5.215	5.229	2.748	2.672	5.011	-0.098	4.988
WIND DIR. (Deg. True)	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
	BULK WT. TEMP. (Celsius)	AC FREQUENCY (Hz)	AC VOLTAGE (Volts)	MANUAL FLAG	ZERO REF. (Volts)	SPARE A	SPARE B	VOL. REF. B	
	265.637	5.064	2.584	0.001	0.001	0.001	0.001	6.205	

## \* ANALOG CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

NO. 1	NO. 2	UPWIND NEAR	UPWIND (M)	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	WS1EC	WS2EC
WIND DIR. (Deg. True)	WIND DIR. (Deg. True)	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
314.6	314.6	0.185	115	-0.009	0.000	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

PROGRAM	ERROR	DATA	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
1	1	129	0.0000	0.0000	0.0000	0.0000	0.0000	115.0	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND DIR. (Deg. True)	WIND SPEED 1 (Meters/Sec)	DEW POINT 1 (Celsius)	TEMP. STRUCT. 1 (Celsius)	WIND DIR. (Deg. True)	BAR. PRES. 1 (Millibar)	SKY RAD. (Celsius)	BULK WT. TEMP. (Celsius)	MEAN AIR TEMP. (Celsius)
314.6	5.31	10.02	NO DATA	314.6	1015.09	1.37E 01	13.401	265.637
WIND DIR. (Deg. True)	WIND SPEED 2 (Meters/Sec)	DEW POINT 2 (Celsius)	TEMP. STRUCT. 2 (Celsius)	TIDE TABLE (Meters MSL)	BAR. PRES. 2 (Millibar)			
314.6	5.07	10.85	NO DATA	-0.09	1016.19			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

REL. HUMID. 1 (Percent)	POT. TEMP. 1 (Celsius)	WIND DIR. 1 (Deg. True)	WIND SPEED 1 (Meters/Sec)	REL. HUMID. 2 (Percent)	POT. TEMP. 2 (Celsius)	WIND DIR. 2 (Deg. True)	WIND SPEED 2 (Meters/Sec)
89.88	12.615	314.6	5.31	89.53	12.610	314.6	5.07

## \* CONTINUED BELOW

RUN NUMBER: 790504200  
START TIME: 07:50 PST  
END TIME: 08:00 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRASS RICHARDSON NUMBER (Stability) (Instability) 0.043 AT 0M	MOISTURE FLUX (Meters/Sec) -3.18E-02	FRICTION VELOCITY (Meters/Sec) 1.607E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/[Ln(Z1/Z2)]*	GENERAL FORM: N SLOPE = [(Ln Z1 - PSI) - (Ln Z2 - PSI)] / (N1 - N2)
EDMUND MEAN HEIGHT (Meters) (Meters) 12.29	HUMIDITY FLUX (Kg/Kg) 1.36E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.870E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 2.67E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.49E 00
FLAT 0M	LAT. HEAT FLUX (Watts/m2) 5.76E 01	SCALING POT. TEMP. (Kelvin) -6.870E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.87E 03
Z1 AT 10 METERS 0.043	SUN HEAT FLUX (Watts/m2) 1.38E 00	ROUGHNESS LENGTH (Meters) 5.108E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -7.87E 01
Z1 AT Z1 0.043	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.31E 03		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z1 AT Z2 0.032	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.87E 01			
PROFILE SLOPE LENGTH (Meters) 2.407E 02	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1 0.215282 PSI1 AT Z2 0.119659 PSI2 AT Z1 0.135404 PSI2 AT Z2 0.074478				

## \* GENERAL CONSTANTS:

SW. PARADIA	EVAPORATION	PROFILE	PROFILE	BULK	BULK
CONSTANT	CONSTANT	CONSTANT	CONSTANT	CONSTANT	CONSTANT
1.4	0.2959	0.74	0.74	0.92E-03	1.32E-03

## \* COMMENTS:

A 10 m. measurement exceeded for measurement of Profile Slope and/or Partial Derivative.  
Extrapolated by insertion of

0.01500 kg/m3 at 10 m  
0.01500 kg/m3 at 10 m

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2328

AIR SPECIFIC HEAT  
(J/Kg.Kel.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(J/Kg.Kel.)  
5.9026E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905042200  
 START TIME: 22: 5:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 12.509	WIND SPEED (Meter/sec) 5.10	DEW POINT (Celsius) 10.84	TEMP. STRUC. (Kel x m-2/3) NO DATA	BAR. PRES. (Millibar) 1016.09	BULK WT TEMP (Celsius) 13.401	AIR-WT TEMP (Kelvin) -0.892	POT-WT TEMP (Kelvin) -0.794	VIR-WT TEMP (Kelvin) 0.499	U POT-WT TEMP (Kelvin) 0.597
HEIGHT (Meters) 10.00	POT TEMP (Celsius) 12.607	VIR TEMP. (Celsius) 13.901	U POT TEMP. (Celsius) 13.999	ABS. HUMID. (Kg/m3) 9.876E-03	REL. HUMID. (Percent) 89.57	SPEC. HUMID. (Kg/Kg) 8.009E-03	VAP. PRES. (Millibars) 13.020	S. VAP. PRES. (Millibars) 14.536	REF. INDEX (Kel x m-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.230 AT GMM	MOMENTUM FLUX (Nt/m2) -3.10E-02	FRICTION VELOCITY (Meters/sec) 1.585E-01	WITH LONG. VELOCITY (Meter2/sec2) -0.511E-02	AIR DENSITY (Kg/m3) 1.2331
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.162E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.204E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4173E 02
Z/L AT GMM -0.256	LAT. HEAT FLUX (Watts/m2) 2.98E 01	SCALING POT. TEMP. (Kelvin) -3.611E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.722E-03	WATER LAT. HEAT VAP. (J/cal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.197	SEN. HEAT FLUX (Watts/m2) 7.14E 00	ROUGHNESS LENGTH (Meters) 4.714E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.420
MONIN-OBUKHOV LENGTH (Meters) -5.069E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 9.664E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.06E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.29
	BOWEN RATIO (no units) 0.240			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
221%	221%	149%	188%	188%	10%	130%	377%	75%	114%	114%	95%	149%
193%	193%	46%	50%	121%	10%	34%	171%	23%	73%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042200  
 START TIME: 22: 5:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.142 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -3.12E-02 (4.0E-02)	FRICTION VELOCITY (Meters/sec) 1.590E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.24E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.439E-05 (3.0E-05)
Z/L AT GMM 0.161 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.06E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.979E-02 (2.0E-02)
Z/L AT 10 METERS -0.124 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.89E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.837E-06 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -8.059E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 9.040E-04 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.02E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.178 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
66%	63%	1%	7%	60%	0%	2%	60%	1%	6%	74%	0%	1%

ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905042230  
START TIME: 22:36:10 PST  
END TIME: 23:06:20 PST  
START DATE: 4 May 1979 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

\* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 1	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.230	5.243	2.879	2.799	5.013	-0.098	4.841
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.743	3.860	2.504	0.001	0.001	0.001	0.001	6.205		

\* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DPL. CAL	DPL. CAL	WIND. CAL	WIND. CAL	WIND. CAL	WIND. CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 124775	1421 125605	0.107	118	-0.009	0.000	0.000	0.000	0.000	0.000

\* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV. 1	VOLT. REF. DEV. 2	ZERO REF. DEV. 1	ZERO REF. DEV. 2	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	0	100.0	57.06

\* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg True)	(Millibar)	(Watts/m2)	(Celsius)	(Celsius)
12.478	5.57	10.91	NO DATA	109.6	1015.12	1.37E-01	15.390	205.675
AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)			
12.561	5.34	10.93	NO DATA	-0.11	1016.20			

\* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	12.657	13.874	14.054	9.910E-03	90.14	8.043E-03	13.063	14.491	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AIR HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	12.651	13.960	14.050	9.935E-03	89.77	8.056E-03	13.098	14.586	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905042230  
START TIME: 22:36:10 PST  
START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

\* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHNCR, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.048 AT GMM	MOMENTUM FLUX (Nt/m2) -2.90E-02	FRICTION VELOCITY (Meters/sec) 1.534E-01	GENERAL FORM: $DN/DZ = (N1-N2)/[1/(N1/Z1)^2 + 1/(N2/Z2)^2]$	GENERAL FORM: $N/SLOPE = [1/(N1/Z1)^2 + 1/(N2/Z2)^2] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meters) $GMM = (Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec m2) 1.31E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.927E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DWS/DZ = -2.52E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis $PS1=PS11$ $WS SLOPE = 2.61E-00$
Z/L AT GMM -0.058	LAT. HEAT FLUX (Watts/m2) 3.24E-01	SCALING POT. TEMP. (Kelvin) -6.927E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis $PS1=PS12$ $SH SLOPE = -7.80E-03$
Z/L AT 10 METERS -0.045	SEN. HEAT FLUX (Watts/m2) 1.33E-00	ROUGHNESS LENGTH (Meters) 3.896E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -8.92E-04$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis $PS1=PS12$ $PTK SLOPE = 7.80E-01$
Z/L AT Z1 -0.042	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.00E-00		N=TEMP. STRUC. (K/m-2/3) Z=HEIGHT (M) Vert. Axis $PS1=NONE$ $CT2 SLOPE = NO DATA$
Z/L AT Z2 -0.041	TOTAL HEAT RUDGET FLUX (Watts/m2) 4.74E-01			
MININ-ORIKHOV LENGTH (Meters) -2.726E-02	ROMIN RATIO (no units) 0.041			
PS11 AT Z1= 0.232766 PS11 AT Z2= 0.141760 PS12 AT Z1= 0.148320 PS12 AT Z2= 0.082173				

\* GENERAL CONSTANTS:

VON KARMAN  
CONSTANT  
(No units)  
0.4

GRAVITATION  
ACCELERATION  
(M/sec 2)  
9.7959

PROFILE  
TUR. PRANDTL  
NUMBER  
0.74

PROFILE  
TUR. SCHMIDT  
NUMBER  
0.74

BULK  
SEN. HEAT  
TRANSF. COEFF.  
0.92E-03

BULK  
MOISTURE  
TRANSF. COEFF.  
1.32E-03

MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2327

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4174E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9023E-05

\* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.  
PTK1-PTK2= +/- .00E Kel.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905042230  
 START TIME: 22:36:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP STROC (Kelvin)	PRESS (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT WT TEMP (Kelvin)
12.551	5.37	10.93	NO DATA	1016.12	13.392	0.841	0.743	0.558	0.656

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin)
10.00	12.649	13.950	14.048	9.930E-03	89.84	0.054E-03	13.054	14.175	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT 10 METERS: (Z=10, U=5.37, T=12.65, RH=89.84, P=1016.12)

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED VELOCITY UP, DOWN	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.188 AT GMH	MOMENTUM FLUX (Nt/m2) -3.50E-02	FRICTION VELOCITY (Meters/sec) 1.684E-01	WITH LONG VELOCITY (Meter/Sec) 2.835E-02	AIR DENSITY (Kg/m3) 1.2330
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.22E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.980E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.225E-05	AIR SPECIFIC HEAT (Jtcal/Kg Kel) 2.4174E-02
Z/L AT GMH -0.212	LAT. HEAT FLUX (Watts/m2) 3.03E-01	SCALING POT. TEMP. (Kelvin) -3.368E-02	WITH POT. TEMPERATURE (Meter Kel /sec) 5.671E-03	WATER LAT. HEAT VAP. (Jtcal/Kg Kel) 5.9022E-05
Z/L AT 10 METERS -0.163	SEN. HEAT FLUX (Watts/m2) 7.08E-06	ROUGHNESS LENGTH (Meters) 6.623E-06		VAP. PRES. AT WT LEVEL (Millibar) 15.419
MOMIN-OBUKHOV LENGTH (Meters) -6.138E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 9.842E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.10E-01			HAR. PRES. AT WT LEVEL (Millibar) 1017.37
	BOWEN RATIO (no units) 0.234			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "or."

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEFF
235%	235%	165%	198%	198%	10%	135%	396%	83%	115%	11%	10%	16%
197%	197%	46%	51%	125%	10%	35%	176%	23%	74%	146%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042230  
 START TIME: 22:36:10 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.124 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -3.37E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 1.651E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.24E-05 [1.8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.302E-05 [3.0E-05]
Z/L AT GMH -0.142 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.07E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.862E-02 [2.0E-02]
Z/L AT 10 METERS -0.109 [0.02]	SEN. HEAT FLUX (Watts/m2) 4.85E-06 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.819E-06 [6.0E-05]
MOMIN-OBUKHOV LENGTH (Meters) -9.168E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.001E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.03E-01 [4.0E+01]	
	BOWEN RATIO (no units) 0.174 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "or."

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEFF
57%	54%	6%	4%	61%	0%	4%	59%	5%	8%	67%	1%	

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 2905042500  
START TIME: 01:03:30 PST  
END TIME: 01:36:46 PST  
START DATE: 4 May 1977 (DAY 124)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND DIR. 1	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.000	0.001	5.243	5.255	3.385	3.266	5.000	-0.098	4.807
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AD. FREQUENCY	AD. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPTFCAL	DPPEFCAL	WTFECAL	WSIEC	WSIEC
ATK TEMP. 1	ATK TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124236	1421 125123	0.157	119	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1.1Hz)	(V)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATK TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/Sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.424	6.54	10.98	NO DATA	308.5	1014.94	1.37E 01	13.379	285.628
ATK TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/Sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
12.512	6.20	11.00	NO DATA	-0.12	1016.04			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
18.35	12.604	13.827	14.007	9.960E-03	90.92	8.084E-03	13.127	14.438	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)
9.20	12.603	13.918	14.008	9.979E-03	90.92	8.093E-03	13.156	14.538	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 2905042500  
START TIME: 01:03:30 PST  
START DATE: 4 May 1977 (DAY 124)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
ATK. ESCARPMENT NUMBER (+UNSTABLE, -UNSTABLE) 0.002	MOMENTUM FLUX (N/m2) -5.50E-02	FRICITION VELOCITY (Meters/sec) 2.113E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(1+Z1/Z2)]* [Z1/Z2]1/2	GENERAL FORM: N SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
WIND SPEED, MEAN HEIGHT (Meters) (Z1+Z2)/2 12.55	HUMIDITY FLUX (Kg/sec m2) 1.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.618E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 3.72E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.89E 00
Z/L AT 0.0M 0.000	LAT. HEAT FLUX (Watts/m2) 4.26E 01	SCALING POT. TEMP. (Kelvin) -6.618E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.17E 03
Z/L AT Z1 0.000	SUN HEAT FLUX (Watts/m2) 1.74E 00	ROUGHNESS LENGTH (Meters) 1.999E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.17E 01
Z/L AT Z2 0.000	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.39E-03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MOIN. DRAG COEFF. LENGTH (Meters) 4.663E 00	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.80E 01			
PS1 AT Z1 = 0.126318 PS1 AT Z2 = 0.368010 PS1 AT Z1 = 0.698224 PS1 AT Z2 = 0.841701	BOWEN RATIO (No units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT	GRAVITATION	PRANDTL	PRANDTL	BULK	BULK
(No units)	(M/sec2)	TUR. PRANDTL <td>TUR. SCHMIDT <td>SEN HEAT <td>MOISTURE </td></td></td>	TUR. SCHMIDT <td>SEN HEAT <td>MOISTURE </td></td>	SEN HEAT <td>MOISTURE </td>	MOISTURE
0.4	9.7979	0.74	0.74	TRANSF. COEFF.	TRANSF. COEFF.

## \* MISCELLANEOUS

\* GENERAL NOTES:  
Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = 1/2 GUL = 3 Kg/Kg  
PS1, PS12 = 1/2 0.00 KxL

AIR SPECIFIC HEAT  
(J/cal /Kg Kel)  
2.4175E 02

WATER LAT. HEAT VAP  
(J/cal /Kg)  
5.9026E 05

RUN NUMBER: 7905042300  
 START TIME: 23: 6:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	HAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.502	6.24	11.00	NO DATA	1015.95	13.379	-0.877	-0.779	0.528	0.626

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.680	13.907	14.005	9.977E-03	90.54	8.092E-03	13.153	14.526	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.122 AT 10M	MOMENTUM FLUX (Nt/m2) -5.01E-02	FRICTION VELOCITY (Meters/sec) 2.00E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.062E-02	AIR DENSITY (Kg/m3) 1.2329
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.38E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.542E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.377E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4175E 02
Z/L AT GMH -0.141	LAT. HEAT FLUX (Watts/m2) 3.40E 01	SCALING POT. TEMP. (Kelvin) -3.213E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.476E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.109	SEN. HEAT FLUX (Watts/m2) 8.08E 00	ROUGHNESS LENGTH (Meters) 1.618E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.403
MONIN-OBUKHOV LENGTH (Meters) -9.217E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.042E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.165E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.58E 01			BAR. PRES. AT WT LEVEL (Millibar) 1017.15
	DOWN RATIO (no units) 0.237			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
207%	207%	130%	177%	177%	10%	130%	354%	65%	112%	112%	85%	130%
194%	194%	46%	52%	122%	10%	36%	174%	23%	75%	145%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042300  
 START TIME: 23: 6:30 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.074 [0.07] AT 10M	MOMENTUM FLUX (Nt/m2) -5.14E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.041E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.46E-05 [1.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.974E-05 [3.0E-05]
Z/L AT GMH -0.086 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.60E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.772E-02 [2.0E-02]
Z/L AT 10 METERS -0.066 [0.02]	SEN. HEAT FLUX (Watts/m2) 5.49E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.746E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.507E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.10E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.65E 01 [3.0E+01]	
	DOWN RATIO (no units) 0.173 [0.001]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
68%	64%	5%	14%	59%	0%	2%	60%	3%	9%	64%	3%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905042330  
START TIME: 03:36:50 PST  
END TIME: 01:07:00 PST  
START DATE: 4 May 1979 (DAY 174)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DIR. POINT 11	DIR. POINT 12	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.746	5.258	5.977	3.845	4.996	-0.094	4.047
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZYMO REL.	SPARE A	SPARE B	VOL. T. REF. B		
3.717	3.057	0.583	1.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND FAN	OPTICAL	OPTICAL	OPTICAL	WATER	WATER
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH/ANGLE	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.173785	1421.174599	0.157	119	0.109	0.000	0.000	0.993	0.999

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOL. T. REF. A	VOL. T. REF. B	ZERO REF. DIR	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. 00000)	(No. 0000)	(No. 0000)	(No. 0.0000)	(No. 0.0000)	(No. 0.0000)	(No. 0.000)	(No. 0.000)	(No. 0.000)	(No. 0.000)
0	1	174	0	0	0	0	0	0	0

## \* DERIVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DIR. POINT 11	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	POSS. AIR TEMP.
(Celsius)	(Meters/sec)	(No. 00)	(Celsius)	(Deg. True)	(Millibar)	(Watts/m <sup>2</sup> )	(Celsius)	(Celsius)
12.69	7.67	11.01	NO DATA	59.8	1014.85	1.37E-01	13.766	205.574
AIR TEMP. 2	WIND SPEED 2	DIR. POINT 12	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meters/sec)	(No. 00)	(Celsius)	(Meter ASL)	(Millibar)			
12.460	7.27	11.02	NO DATA	-0.17	1015.95			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 273)
18.35	12.548	13.774	13.974	9.976E-03	91.39	8.096E-03	13.145	14.384	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 273)
9.20	12.550	13.867	13.972	9.994E-03	90.93	8.104E-03	13.173	14.487	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905042330  
START TIME: 03:36:50 PST  
START DATE: 4 May 1979 (DAY 174)

MARINE SURFACE LAYER  
RAW MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

START/ITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCL, WITH HEIGHT)
GRAD. Richardson NUMBER (+Stable, -Unstable) -0.015 AT GHM	MOMENTUM FLUX (N/m <sup>2</sup> ) -2.65E-02	FRICITION VELOCITY (Meters/sec) 2.491E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/11n((Z1/Z2)x (Z1+Z2)/1/2)	GENERAL FORM: N SLOPE = 1/(lnZ1-PS1) - (lnZ2-PS2)/1/2 (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GHM = (Z1+Z2)/2 12.7	HUMIDITY FLUX (Kg/sec. m <sup>2</sup> ) 2.10E-03	SCALING SPEC. HUMID. (Kg/Kg) 6.519E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = 4.49E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1-PS2 WS SLOPE = 1.61E-00
Z/L AT GHM -0.019	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.91E-01	SCALING POT. TEMP. (Kelvin) 6.519E-03	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PS1-PS2 SH SLOPE = 8.29E-03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 2.03E-00	ROUGHNESS LENGTH (Meters) 3.968E-05	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -8.92E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1-PS2 PTK SLOPE = 0.291E-01
Z/L AT Z1 -0.022	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.37E-01	DRAIN COEFF. AT 10 METERS (Dimensionless) 1.394E-03		
Z/L AT Z2 0.014	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 6.52E-01			
MONTEN-OUKHAZ LENGTH (Meters) 6.688E-02	BOWEN RATIO (No units) 0.041			
PS11 AT Z1 = 0.091040 PS11 AT Z2 = 0.048562 PS12 AT Z1 = 0.056691 PS12 AT Z2 = 0.029694				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.7959	PROFILE TUM. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2328

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- 0.01 Kg/Kg  
PTK1 PTK2 +/- 0.00H Kel.

AIR SPECIFIC HEAT  
(Cal/Kg Kel.)  
0.417E-02

WATER LAT. HEAT VAP  
(Cal/Kg)  
5.902E-05

RUN NUMBER: 7905042330  
 START TIME: 23:36:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10M METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.449	7.32	11.02	NO DATA	1015.85	13.366	-0.917	-0.819	0.490	0.589

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibar)	S. VAP. PRES. (Millibar)	REF. INDEX (Kelvin-2/3)
10.00	12.547	13.856	13.954	9.992E-03	90.99	8.193E-03	13.170	14.475	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.078 AT GMM	MOMENTUM FLUX (Nt/m2) -7.35E-02	FRICTION VELOCITY (Meters/sec) 2.442E-01	WITH LONG. VELOCITY (Meter2/sec2) -5.964E-02	AIR DENSITY (Kg/m3) 1.2330
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.59E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.281E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.590E-05	AIR SPECIFIC HEAT (J/cal./Kg) 2.417E-02
Z/L AT GMM -0.092	LAT. HEAT FLUX (Watts/m2) 3.93E-01	SCALING POT. TEMP. (Kelvin) -3.078E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.518E-03	WATER LAT. HEAT VAP. (J/cal./Kg) 5.9027E-05
Z/L AT 10 METERS -0.071	SEN. HEAT FLUX (Watts/m2) 9.38E-00	ROUGHNESS LENGTH (Meters) 3.665E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.389
MONIN-OBUKHOV LENGTH (Meters) -1.412E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.113E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.24E-01			BAR. PRES. AT WT LEVEL (Millibar) 1017.05
	BOWEN RATIO (no units) 0.239			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
204%	204%	126%	174%	174%	10%	132%	349%	63%	111%	111%	83%	126%
191%	191%	46%	52%	119%	10%	38%	171%	23%	75%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905042330  
 START TIME: 23:36:50 PST  
 START DATE: 4 May 1979 (DAY 124)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.047 [0.021 AT GMM]	MOMENTUM FLUX (Nt/m2) -7.43E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.455E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.69E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.781E-05 [3.0E-05]
Z/L AT GMM -0.057 [0.021]	LAT. HEAT FLUX (Watts/m2) 4.17E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.717E-02 [2.0E-02]
Z/L AT 10 METERS -0.044 [0.021]	SEN. HEAT FLUX (Watts/m2) 6.40E-00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.769E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.284E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.113E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.30E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.174 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
66%	64%	2%	14%	5%	0%	3%	60%	12	112	612	12	

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905050000  
START TIME: 00: 7:10 PST  
END TIME: 00:37:00 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.000	0.001	5.230	5.245	4.820	4.617	4.977	-0.098	4.972
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
TEMP. REF. A	TEMP. REF. B	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. REF. B		
0.000	0.000	0.000	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC			
HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)			
0.185	116	-0.009	0.000	0.000	0.992	0.952			

## \* ANALOG ESCAPMENT PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36	NO. 37
MANUAL FLAG	ERROR COUNT	DATA NAME	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOL. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. 00)	(No. 00)	(No. 00)	A(No. 00)0050	B(No. 00)0050	(No. 00)0020	(No. 00)50	(No. 00)1Hz	(VAC)	(Hz)
0	0	100	0	0	0	0	0	115.0	59.86

## \* ESCAPMENT MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45	NO. 46	NO. 47
WIND DIR. 1	WIND DIR. 2	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP				
(Deg. True)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)				
314.0	314.0	1014.55	1.37E-01	13.354	285.557				
NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA				
NO. 48 <td>NO. 49 <td>NO. 50 <td>NO. 51 <td>NO. 52 <td>NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td></td></td></td></td></td>	NO. 49 <td>NO. 50 <td>NO. 51 <td>NO. 52 <td>NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td></td></td></td></td>	NO. 50 <td>NO. 51 <td>NO. 52 <td>NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td></td></td></td>	NO. 51 <td>NO. 52 <td>NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td></td></td>	NO. 52 <td>NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td></td>	NO. 53 <td>NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td></td>	NO. 54 <td>NO. 55 <td>NO. 56 <td>NO. 57</td> </td></td>	NO. 55 <td>NO. 56 <td>NO. 57</td> </td>	NO. 56 <td>NO. 57</td>	NO. 57
WIND DIR. 1	WIND DIR. 2	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP				
(Deg. True)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)				
314.0	314.0	1014.55	1.37E-01	13.354	285.557				
NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA				

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

NO. 58	NO. 59	NO. 60	NO. 61	NO. 62	NO. 63	NO. 64	NO. 65	NO. 66	NO. 67
REL. HUMID. 1	REL. HUMID. 2	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1				
(Percent)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)				
90.92	90.92	0.045E-03	13.059	14.364	NO DATA				
NO. 68 <td>NO. 69 <td>NO. 70 <td>NO. 71 <td>NO. 72 <td>NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td></td></td></td></td></td>	NO. 69 <td>NO. 70 <td>NO. 71 <td>NO. 72 <td>NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td></td></td></td></td>	NO. 70 <td>NO. 71 <td>NO. 72 <td>NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td></td></td></td>	NO. 71 <td>NO. 72 <td>NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td></td></td>	NO. 72 <td>NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td></td>	NO. 73 <td>NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td></td>	NO. 74 <td>NO. 75 <td>NO. 76 <td>NO. 77</td> </td></td>	NO. 75 <td>NO. 76 <td>NO. 77</td> </td>	NO. 76 <td>NO. 77</td>	NO. 77
REL. HUMID. 1	REL. HUMID. 2	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1				
(Percent)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)				
90.92	90.92	0.045E-03	13.059	14.364	NO DATA				
NO. 78 <td>NO. 79 <td>NO. 80 <td>NO. 81 <td>NO. 82 <td>NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td></td></td></td></td></td>	NO. 79 <td>NO. 80 <td>NO. 81 <td>NO. 82 <td>NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td></td></td></td></td>	NO. 80 <td>NO. 81 <td>NO. 82 <td>NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td></td></td></td>	NO. 81 <td>NO. 82 <td>NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td></td></td>	NO. 82 <td>NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td></td>	NO. 83 <td>NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td></td>	NO. 84 <td>NO. 85 <td>NO. 86 <td>NO. 87</td> </td></td>	NO. 85 <td>NO. 86 <td>NO. 87</td> </td>	NO. 86 <td>NO. 87</td>	NO. 87
REL. HUMID. 1	REL. HUMID. 2	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1				
(Percent)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin)				
90.92	90.92	0.045E-03	13.059	14.364	NO DATA				

## \* CONTINUED BELOW

RUN NUMBER: 2905050000  
START TIME: 00: 7:10 PST  
END TIME: 00:37:00 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRISINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
BRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 AT 0M	MOMENTUM FLUX (N/m2) -1.83E-01	FRICTION VELOCITY (Meters/sec) 3.849E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(L1+L2)]*( Z1+Z2)/L1	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Center) GMM=(Z1+Z2)/2 12.99	HEAT FLUX (Kq/sec m2) 3.02E-05	SCALING SPEC. HUMID. (Kq/Kg) -6.37E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.20E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.04E-00
Z/L AT GMM 0.008	LAT. HEAT FLUX (Watt/m2) 7.47E-01	SCALING POT. TEMP. (Kelvin) -6.37E-03	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.4HE-03
Z/L AT 10 METERS 0.006	SEN. HEAT FLUX (Watt/m2) -8.06E-00	ROUGHNESS LENGTH (Meters) 1.959E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.4HE-01
Z/L AT Z1 0.001	SKY AND SOLAR HEAT FLUX (Watt/m2) 1.37E-01	DRAW COEFF. AT 10 METERS (Dimensionless) -0.89E-03		N=LAT. HEAT FLUX (Kq/m2) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.005	TOTAL HEAT FLUX (Watt/m2) 9.14E-01			
DOWNWIND RUGHESS LENGTH (Meters) 1.024E-05	BOWEN RATIO (no units) 0.041			
REL. AT Z1 = 0.05143 REL. AT Z2 = 0.05074 REL. AT Z1 = 0.05093 REL. AT Z2 = 0.05139				

## \* GENERAL COMMENTS:

SUN VARIATION CONSTANT (no units) 0.4	GRAVITATION ACCELERATION (m/sec2) 9.7909	PROFILE NUMBER 6.74	PROFILE NUMBER 0.74	BULK SIN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kq/m3)  
1.2325

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Calculation executed by insertion of:

SH1-SH2 +/- 0.0E-3 Kq/Kg  
PTK1-PTK2 +/- 0.0E-01 Kel.

AIR SPECIFIC HEAT  
(Jcal /Kq Kel.)  
2.4174E-02

WATER LAT. HEAT VAP.  
(Jcal /Kq)  
5.9038E-05



RUN NUMBER: 790505000  
 START TIME: 0: 7:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-W. TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.431	8.71	10.94	NO DATA	1015.56	13.354	-0.923	-0.825	0.477	0.575
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.529	13.831	13.929	9.936E-03	90.61	8.040E-03	13.096	14.453	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.045 AT 10M	MOMENTUM FLUX (Nt/m2) -1.13E-01	FRICTION VELOCITY (Meters/sec) 3.024E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.147E-02	AIR DENSITY (Kg/m3) 1.2328
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.94E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.211E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.943E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4174E-02
Z/L AT GMH -0.055	LAT. HEAT FLUX (Watts/m2) 4.80E-01	SCALING POT. TEMP. (Kelvin) -2.847E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 8.611E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E-05
Z/L AT 10 METERS -0.043	SEN. HEAT FLUX (Watts/m2) 1.07E-01	ROUGHNESS LENGTH (Meters) 8.281E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.372
MONIN-ORUKHOV LENGTH (Meters) -2.342E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.205E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.163E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.24E-01			BAR. PRES. AT WT LEVEL (Millibar) 1016.76
	BOWEN RATIO (no units) 0.224			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "for":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
170%	170%	96%	157%	157%	10%	129%	315%	48%	109%	109%	69%	96%
191%	191%	46%	52%	119%	10%	39%	170%	23%	75%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 790505000  
 START TIME: 0: 7:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 [0.021 AT GMH]	MOMENTUM FLUX (Nt/m2) -1.30E-01 [1.60E-02]	FRICTION VELOCITY (Meters/sec) 3.292E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.21E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.68E-05 [3.0E-05]
Z/L AT GMH -0.031 [0.021]	LAT. HEAT FLUX (Watts/m2) 5.46E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.599E-02 [2.0E-02]
Z/L AT 10 METERS -0.024 [0.021]	SEN. HEAT FLUX (Watts/m2) 7.44E-01 [3.0E+01]	ROUGHNESS LENGTH (Meters) 1.266E-04 [6.0E-05]
MONIN-ORUKHOV LENGTH (Meters) -4.221E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01 [1.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 1.44E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.60E-01 [3.0E+01]	
	BOWEN RATIO (no units) 0.160 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "for":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
79%	70%	27%	27%	50%	0%	14%	60%	13%	10%	56%	46%	94%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905050030  
START TIME: 0:37:30 PST  
END TIME: 1: 7:40 PST  
START DATE: 5 May 1979 (DAY 175)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL TO CHANNEL 15, 1000 Hz  
DATA AVERAGING PERIOD: 5 MIN  
NOMINAL ALTITUDE: 1000 FT (UPPER LEVEL), 2000 FT (LOWER LEVEL)

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	WIND SPEED 3	WIND SPEED 4	WIND SPEED 5
6.205	0.000	0.001	5.229	5.248	4.765	4.505	4.557	4.550	4.550
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT. TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARK W	SPARK R	SPARK B	SPARK G	SPARK Y
3.686	3.869	2.503	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEEDS BASED ON FIELD DATA

No. 1	No. 2	UPWIND NEAR	UPWIND FAND	OPTICAL	DETERMINED	WIND 1	WIND 2	WIND 3	WIND 4
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PAIHEMETER	(Volts)	(Volts)	(M/sec)	(M/sec)	(M/sec)	(M/sec)
1411 123016	1421 123945	0.183	114	0.009	0.009	0.009	0.009	0.009	0.009

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	WIND REF. DEV	ZERO REF. DEV	WIND REF. DEV	WIND REF. DEV	WIND REF. DEV	WIND REF. DEV
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
9	9	180	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE AND ESCARPMENT CORRECTIONS, WIND SPEEDS BASED ON FIELD DATA)

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR PRESS. 1	WIND 2	WIND 3	WIND 4	WIND 5
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(deg. True)	(Millibar)	(M/sec)	(M/sec)	(M/sec)	(M/sec)
12.302	9.96	10.90	NO DATA	376.7	1014.70	1014.70	1014.70	1014.70	1014.70
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR	BAR PRESS. 2	WIND 3	WIND 4	WIND 5	WIND 6
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(deg. True)	(Millibar)	(M/sec)	(M/sec)	(M/sec)	(M/sec)
12.394	8.52	10.91	NO DATA	376.7	1014.70	1014.70	1014.70	1014.70	1014.70

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	REL. HUMID. 1	REL. HUMID. 1	REL. HUMID. 1	REL. HUMID. 1	REL. HUMID. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )
18.35	12.481	13.697	13.877	9.96E-03	9.96E-03	9.96E-03	9.96E-03	9.96E-03	9.96E-03
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	REL. HUMID. 2	REL. HUMID. 2	REL. HUMID. 2	REL. HUMID. 2	REL. HUMID. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )
9.28	12.465	13.791	13.881	9.96E-03	9.96E-03	9.96E-03	9.96E-03	9.96E-03	9.96E-03

## \* CONTINUED BELOW

RUN NUMBER: 7905050030  
START TIME: 0:37:30 PST  
START DATE: 5 May 1979 (DAY 175)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL TO CHANNEL 15, 1000 Hz  
DATA AVERAGING PERIOD: 5 MIN  
NOMINAL ALTITUDE: 1000 FT (UPPER LEVEL), 2000 FT (LOWER LEVEL)

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (REF IN PAR 19.3)

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	WIND SPEED CORRECTIONS
BRAD. RICHARDSON NUMBER	MOMENTUM FLUX	SCALING LENGTH	GENERAL FORM FOR Z1	GENERAL FORM FOR Z2
(+Stable, -Unstable)	(N/m <sup>2</sup> )	(Meters)	(Meters)	(Meters)
0.008 AT 6M	-1.32E-01	1.32E-01	214.07E-01	214.07E-01
GEOMETRIC MEAN HEIGHT	MOISTURE FLUX	SCALING LENGTH	WIND SPEED CORRECTION	WIND SPEED CORRECTION
(Meter) GMH (Z1+Z2)/2	(kg/sec/m <sup>2</sup> )	(Meters)	(Meters)	(Meters)
12.99	0.09E-05	6.41E-01	6.41E-01	6.41E-01
Z/L AT GMH	LAT. HEAT FLUX	SCALING POT. TEMP	WIND SPEED CORRECTION	WIND SPEED CORRECTION
-0.011	(Watts/m <sup>2</sup> )	(K)	(Meters)	(Meters)
Z/L AT 10 METERS	SEN. HEAT FLUX	ROUGHNESS LENGTH	WIND SPEED CORRECTION	WIND SPEED CORRECTION
-0.008	(Watts/m <sup>2</sup> )	(Meters)	(Meters)	(Meters)
Z/L AT Z1	SKY AND SOLAR HEAT FLUX	ROUGHNESS LENGTH	WIND SPEED CORRECTION	WIND SPEED CORRECTION
-0.011	(Watts/m <sup>2</sup> )	(Meters)	(Meters)	(Meters)
Z/L AT Z2	TOTAL HEAT BUDGET FLUX	ROUGHNESS LENGTH	WIND SPEED CORRECTION	WIND SPEED CORRECTION
-0.000	(Watts/m <sup>2</sup> )	(Meters)	(Meters)	(Meters)
MINOR BUKHOV LENGTH	BOWEN RATIO	ROUGHNESS LENGTH	WIND SPEED CORRECTION	WIND SPEED CORRECTION
(Meters)	(No. units)	(Meters)	(Meters)	(Meters)
-1.196E-03	0.041	(Meters)	(Meters)	(Meters)
PS11 AT Z1= 0.053800				
PS11 AT Z2= 0.027874				
PS12 AT Z1= 0.032850				
PS12 AT Z2= 0.018779				

## \* GENERAL CONSTANTS:

VON KARMAN	ADDITIONAL	PRANDTL	PROF. 11	ROUGH	ROUGH
CONSTANT	ADDITIONAL	TUR. PRANDTL	TUR. SCHMIDT	ROUGH	ROUGH
(No. units)	(No. units)	NUMBER	NUMBER	ROUGH	ROUGH
0.4	9.79E-2	0.74	0.74	0.92E-01	1.32E-01

## \* PHYSICAL CONSTANTS:

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.204

## \* GENERAL NOTES:

Accuracy limitation expected for measurement of Profile Slope and/or Partial Derivatives  
Computation executed by insertion of

SKI-SHP = 0.0013 kg/kg  
PK1-PK2 = 0.008 K

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.204

WATER LAT. HEAT CAP  
(J/kg/K)  
4181.4E-01

RUN NUMBER: 7905050030  
 START TIME: 0:37:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: 1000 HZ  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 12.383	WIND SPEED (Meter/Sec) 8.58	DEW POINT (Celsius) 10.91	TEMP STRUC (KELVIN/3) NO DATA	RAI PRES (Millibar) 1015.26	ROCK WT TEMP (Celsius) 13.35	AIR WT TEMP (Celsius) -0.953	POT WT TEMP (Celsius) 0.855	VER WT TEMP (Celsius) 0.444	Q POT WT TEMP (Celsius) 0.540
HEIGHT (Meters) 10.00	POT TEMP (Celsius) 12.481	VIR TEMP (Celsius) 13.280	V POT TEMP (Celsius) 13.828	ABS HUMID (Kq/m3) 9.916E-03	REL HUMID (Percent) 90.22	SPCL HUMID (Kq/Kq) 0.044E-03	VAP PRES (Millibar) 13.067	Q VAP PRES (Millibar) 14.494	REF INDEX (Celsius/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (KUTNER ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD RICHARDSON NUMBER (+Stable, -Unstable) -0.049 AT 6M	MOMENTUM FLUX (N/m2) -1.09E-01	FRICTION VELOCITY (Meters/Sec) 2.969E-01	WITH LONG. VELOCITY (Meter2/Sec2) 0.873E-02	AIR DENSITY (Kq/m3) 1.2327
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kq/sec m2) 1.92E-05	SCALING SPEC HUMID (Kq/Kq) -1.042E-05	WITH ABS. HUMIDITY (Meter Kq/sec m3) 1.918E-05	AIR SPECIFIC HEAT (J/Kal Kq Kel) 0.4174E-02
Z/L AT 6M -0.040	LAT HEAT FLUX (Watts/m2) 4.74E-01	SCALING POT TEMP (KELVIN) -2.946E-02	WITH POT TEMPERATURE (Meter Kel/sec2) 8.749E-03	WATER LAT HEAT VAP (J/Kal Kq Kel) 5.9031E-05
Z/L AT 10 METERS 0.046	SEN HEAT FLUX (Watts/m2) 1.09E-01	ROUGHNESS LENGTH (Meters) 2.734E-02		VAP PRES AT WT LEVEL (Millibar) 15.349
MONTIN OBUKHOV LENGTH (Meters) -2.180E-02	SKY AND SOLAR FLUX (Watts/m2) 1.37E-01	DRAW COEF AT 10 METERS (Dimensionless) 1.196E-03		ABS HUMID AT WT LEVEL (Kq/m3) 1.161E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.20E-01			VAP PRES AT WT LEVEL (Millibar) 1016.47
	HUMIN RATIO (No Units) 0.230			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "FOR "

GRAD RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT HEAT FLUX	SEN HEAT FLUX	SKY RAD FLUX	TOTAL HEAT FLUX	HUMIN RATIO	FRICTION VELOCITY	SCALING HUMIDITY	SCALING POT TEMP	ROUGH LENGTH	DRAW COEF
190%	190%	111%	165%	165%	10%	130%	331%	55%	110%	116%	70%	111%
189%	189%	46%	52%	117%	10%	78%	168%	23%	95%	146%	41%	41%

\* CONTINUED BELOW

RUN NUMBER: 7905050030  
 START TIME: 0:37:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: 1000 HZ  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE REPORTED MEASUREMENT ERROR. WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD RICHARDSON NUMBER (+Stable, -Unstable) 0.029 (0.02) AT 6M	MOMENTUM FLUX (N/m2) -1.16E-01 (0.02)	FRICTION VELOCITY (Meters/Sec) 3.059E-01 (0.02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.92	HUMIDITY FLUX (Kq/sec m2) 2.08E-05 (0.02)	SCALING SPEC HUMID (Kq/Kq) -1.215E-05 (0.02)
Z/L AT 6M -0.03% (0.02)	LAT HEAT FLUX (Watts/m2) 5.14E-01 (0.02)	SCALING POT TEMP (KELVIN) 1.659E-02 (0.02)
Z/L AT 10 METERS -0.027 (0.02)	SEN HEAT FLUX (Watts/m2) 7.48E-01 (0.02)	ROUGHNESS LENGTH (Meters) 8.940E-02 (0.02)
MONTIN OBUKHOV LENGTH (Meters) -3.675E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01 (0.02)	DRAW COEF AT 10 METERS (Meters) 1.196E-03 (0.02)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.39E-01 (0.02)	
	HUMIN RATIO (No Units) 0.166 (0.02)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION IS LISTED IN ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER APPLIES) VALUE IS CARRIED. ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "FOR "

GRAD RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT HEAT FLUX	SEN HEAT FLUX	SKY RAD FLUX	TOTAL HEAT FLUX	HUMIN RATIO	FRICTION VELOCITY	SCALING HUMIDITY	SCALING POT TEMP	ROUGH LENGTH	DRAW COEF
71%	69%	11%	19%	56%	0%	62%	60%	5%	10%	50%	1%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 770501100  
START TIME: 11:25:00 PST  
END TIME: 11:30:00 PST  
START DATE: 5 May 1969 (DAY 125)

PRINT DATE: 11 JUN 1968  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ESCARPMENT CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
NO. 00: A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.214	0.000	0.001	5.206	5.212	3.948	3.025	4.949	-0.098	5.442
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
DEW. WT. TEMP. AT FREQUENCY	AT FREQUENCY	AT VOLTAGE	MANUAL FLAG	ZIRU REF.	SPARE A	SPARE B	VOL. 1 REF. B		
0.000	0.000	2.504	0.001	0.001	0.001	0.001	6.204		

## \* ESCARPMENT CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND DIR. 1	WIND DIR. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	W1 CAL	W2 CAL	W3 CAL
141.1000	141.1250	HEIGHT/LENGTH	PATH (METERS)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
		0.103	119	0.009	0.000	5.900	0.551	0.551

## \* ESCARPMENT CHANNEL PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

NO. 01	NO. 02	DATA RATE	UNIT REF. DEW	UNIT REF. DEW	ZIRU REF. DEW	AT VOLT. DEW	AT FREQUENCY	AT FREQUENCY
NO. 01	NO. 02	(Hz)	(KELVIN)	(KELVIN)	(KELVIN)	(KELVIN)	(KELVIN)	(KELVIN)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* ESCARPMENT CHANNEL PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. 1	WIND DIR. 2	TEMP. STRUCT. 1	TEMP. STRUCT. 2	WIND DIR. 1	BAR. PRES. 1	SKY RAD.	DEW. WT. TEMP. AT	DEW. WT. TEMP. AT
141.1000	141.1250	(KELVIN)	(KELVIN)	(Deg. True)	(Millibar)	(Watt/m2)	(KELVIN)	(KELVIN)
		NO DATA	NO DATA	316.7	1014.14	1.47E-01	14.318	14.318

## \* ESCARPMENT CHANNEL PARAMETERS:

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
REL. HUMID. 1	POT. TEMP. 1	VIR. TEMP. 1	U. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1
(Percent)	(Celsius)	(Celsius)	(Celsius)	(KELVIN)	(Percent)	(KELVIN)	(Millibar)	(Millibar)
90.39	12.470	13.672	14.852	9.812E-03	90.39	7.96E-03	12.926	14.380

## \* ESCARPMENT CHANNEL

RUN NUMBER: 770501100  
START TIME: 11:25:00 PST  
END TIME: 11:30:00 PST  
START DATE: 5 May 1969 (DAY 125)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1968  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ESCARPMENT CHANNELS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (ROUSINK, 1973):

Channel	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES
NO. 01: WIND DIR. 1	MOMENTUM FLUX	FRICTION VELOCITY	GENERAL FORM: DN-DZ	GENERAL FORM: N-SLOPE
(KELVIN)	(KELVIN)	(Meters/sec)	(N1-N2)/(Z1-Z2)	(N1-N2)/(Z1-Z2)
NO. 02: WIND DIR. 2	HUMIDITY FLUX	SCALING SPEC. HUMID.	N-WIND SPEED (M/sec)	N-WIND SPEED (M/sec)
(KELVIN)	(KELVIN)	(KELVIN)	Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 03: WIND DIR. 1	U. POT. TEMP. 1	SCALING POT. TEMP.	N-SPEC. HUMIDITY (KELVIN)	N-SPEC. HUMIDITY (KELVIN)
(KELVIN)	(KELVIN)	(KELVIN)	Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 04: WIND DIR. 2	VIR. TEMP. 1	ROUGHNESS LENGTH	N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(KELVIN)	(KELVIN)	(Meters)	Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 05: WIND DIR. 1	ARS. HUMID. 1	DRAG COEFF. AT 10 METERS	N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(KELVIN)	(KELVIN)	(Dimensionsless)	Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 06: WIND DIR. 2	REL. HUMID. 1		N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(Percent)			Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 07: WIND DIR. 1	SPEC. HUMID. 1		N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(KELVIN)			Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 08: WIND DIR. 2	VAP. PRES. 1		N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(Millibar)			Z-HEIGHT (Meters)	Z-HEIGHT (Meters)
NO. 09: WIND DIR. 1	S. VAP. PRES. 1		N-POT. TEMP. (KELVIN)	N-POT. TEMP. (KELVIN)
(Millibar)			Z-HEIGHT (Meters)	Z-HEIGHT (Meters)

## \* ESCARPMENT CHANNELS:

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. 1	WIND DIR. 2	TEMP. STRUCT. 1	TEMP. STRUCT. 2	WIND DIR. 1	BAR. PRES. 1	SKY RAD.	DEW. WT. TEMP. AT	DEW. WT. TEMP. AT
141.1000	141.1250	(KELVIN)	(KELVIN)	(Deg. True)	(Millibar)	(Watt/m2)	(KELVIN)	(KELVIN)
		NO DATA	NO DATA	316.7	1014.14	1.47E-01	14.318	14.318

## \* ESCARPMENT CHANNELS:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computations executed by interpolation of:

NO. 01: WIND DIR. 1  
NO. 02: WIND DIR. 2

## \* ESCARPMENT CHANNELS:

AIR DENSITY  
(KELVIN)

AIR SPECIFIC HEAT  
(KELVIN)

WATER LAT. HEAT CAP  
(KELVIN)

RUN NUMBER: 2905050100  
 START TIME: 11:25:00 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

WIND SPEED	WIND DIRECTION	DEW POINT	TEMP. STRUCT.	BAR. PRES.	BULK WT TEMP	AIR-WT TEMP	POT-WT TEMP	VIR-WT TEMP	V. POT-WT TEMP
10.504	27.04	10.77	NO DATA	1015.14	13.318	-0.950	-0.852	0.434	0.532

DEWPT	POT TEMP	VIR. TEMP.	V. POT. TEMP.	ABS. HUMID.	REL. HUMID.	SPEC. HUMID.	VAP. PRES.	S. VAP. PRES.	REF. INDEX
10.44	10.466	13.750	13.850	9.826E-03	90.00	7.972E-03	12.948	14.388	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.083 AT 0M	MOMENTUM FLUX (N/m <sup>2</sup> ) -7.14E-02	FRICTION VELOCITY (Meters/sec) 2.407E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec <sup>2</sup> ) -5.794E-02	AIR DENSITY (Kg/m <sup>3</sup> ) 1.2326
NEUTRAL MEAN HEIGHT (Meter) GRAD. (21.72)/1.2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.69E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.692E-05	WITH ABS. HUMIDITY (Meter Kg/sec m <sup>3</sup> ) 1.689E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4172E 02
Z/L AT 0M 0.098	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.17E 01	SCALING POT. TEMP. (Kelvin) -3.187E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.671E-03	WATER LAT. HEAT VAP. (J/cal./Kg) 5.9032E 05
Z/L AT 10 METERS 0.075	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 9.57E 00	ROUGHNESS LENGTH (Meters) 3.459E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.330
MONIN-OBUKHOV LENGTH (Meters) -1.325E 02	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.37E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.107E-03		ABS. HUMID. AT WT LEVEL (Kg/m <sup>3</sup> ) 1.159E-02
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 6.50E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.34
	BOWEN RATIO (no units) 0.229			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH.	Z/L	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
197%	197%	118%	170%	170%	10%	130%	33%	59%	111%	111%	79%	118%
189%	189%	46%	51%	117%	10%	37%	167%	23%	74%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 2905050100  
 START TIME: 11:25:00 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.049 [0.01-] AT 0M	MOMENTUM FLUX (N/m <sup>2</sup> ) -7.54E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.471E-01 [6.0E-02]
NEUTRAL MEAN HEIGHT (Meter) GRAD. (21.72)/1.2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.79E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.011E-05 [3.0E-05]
Z/L AT 0M 0.098 [0.02]	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.41E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.771E-02 [2.0E-02]
Z/L AT 10 METERS 0.045 [0.01]	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 8.54E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.981E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.325E 02	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.37E 01 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.107E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 6.57E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.167 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH.	Z/L	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
71%	69%	10%	13%	58%	0%	3%	60%	5%	7%	64%	13%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* ATMOSPHERIC DATA \* \* \* \* \*

RUN NUMBER: 7905010130  
START TIME: 1:38:10 PST  
END TIME: 2:40:26 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VALUES):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF A	TEMP. SENS. 1	TEMP. SENS. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.204	0.010	0.001	5.208	5.215	4.322	4.152	4.930	-0.098	5.672
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. REF. CORR.		
3.643	5.856	2.504	1.031	0.931	9.341	0.000	6.204		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE VALUES): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	OFFICIAL	DEPT. CAL	WIND CAL	WIND CAL	WIND CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 123290	1421 124166	0.183	107	-0.009	0.009	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. 1.000V)	(No. 1.000V)	(No. 1.000V)	(No. 1.000V)	(No. 1.000V)	(No. 1.000V)	(No. 1.000V)
0	1	179	0	0	0	0	0	117.0	5.856

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. SENS. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watts/m2)	(Celsius)	(Kelvin 2/3)
12.329	8.33	12.78	NO DATA	327.4	1014.84	1.324	13.294	265.543
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. SENS. 2	WIND DIR.	BAR. PRES. 2	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watts/m2)	(Celsius)	(Kelvin 2/3)
12.417	7.78	12.76	NO DATA	0.04	1014.93	1.324	13.294	265.543

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	12.509	13.713	13.893	9.817E-03	98.24	7.974E-03	12.934	14.335	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.28	12.507	13.800	13.890	9.814E-03	89.64	7.964E-03	12.936	14.431	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905010130  
START TIME: 1:38:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPE (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GMM	MOMENTUM FLUX (Nt/m2) -1.33E-01	FRICTION VELOCITY (Meters/sec) 3.281E-01	GENERAL FORM: DN/DZ = (N1-N2)/(1+(Z1-Z2)/2) (Z1+Z2)/2	GENERAL FORM: N SLOPE = (1/(N21-P51)) - (1/(N22-P51))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.97	HUMIDITY FLUX (Kg/sec m2) 2.59E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.411E-05	N-WIND SPEED (M/sec) Z=HEIGHT (Meters) DN5/DZ = 6.08E-02	N-WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis P51-P52 WS SLOPE = 1.20E-01
Z/L AT GMM -0.011	LAT. HEAT FLUX (Watts/m2) 6.40E-01	SCALING POT. TEMP. (Kelvin) 6.411E-03	N-SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis P51-P52 SH SLOPE = 8.45E-03
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 2.62E-00	ROUGHNESS LENGTH (Meters) 1.112E-04	N-POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DP1/DZ = 8.92E-04	N-POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis P51-P52 PTK SLOPE = 8.45E-01
Z/L AT Z1 -0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.44E-01		N-TEMP. SENS. (Kelvin 2/3) Z=HEIGHT (M) Vert Axis P51-P52 CT2 SLOPE = NO DATA
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.03E-01			
MONTIN-ORUKHOV LENGTH (Meters) -1.200E-03	ROSEN RATIO (no units) 0.041			
P511 AT Z1 = 0.051639 P511 AT Z2 = 0.027768 P512 AT Z1 = 0.032750 P512 AT Z2 = 0.016817				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kelt.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2318

AIR SPECIFIC HEAT  
(Jcal./Kg Kelt.)  
2.4172E-02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9032E-05

RUN NUMBER: 7905050130  
 START TIME: 1:38:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT. WT TEMP (Kelvin)
12.406	7.85	10.76	NO DATA	1014.84	13.294	-0.888	-0.790	0.495	0.593

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.504	13.789	13.887	9.816E-03	89.71	7.966E-03	12.936	14.420	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEMER ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.061 AT 10M	MOMENTUM FLUX (Nt/m2) -8.71E-02	FRICTION VELOCITY (Meters/sec) 2.659E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.070E-02	AIR DENSITY (Kg/m3) 1.2521
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.82E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.561E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.822E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4172E 02
Z/L AT 10M -0.073	LAT. HEAT FLUX (Watts/m2) 4.50E 01	SCALING POT. TEMP. (Kelvin) -2.897E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.703E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9030E 05
Z/L AT 10 METERS -0.056	SEN. HEAT FLUX (Watts/m2) 9.61E 00	ROUGHNESS LENGTH (Meters) 5.114E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.301
MONIN-OBUKHOV LENGTH (Meters) -1.779E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.148E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.157E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.83E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.04
	BOWEN RATIO (no units) 0.213			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY +D. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
183%	183%	102%	161%	161%	10%	128%	321%	51%	110%	110%	71%	102%
193%	193%	46%	51%	121%	10%	38%	172%	25%	74%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050130  
 START TIME: 1:38:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.01E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.852E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.01E-05 [9.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.903E-05 [3.0E-05]
Z/L AT 10M -0.041 [0.02]	LAT. HEAT FLUX (Watts/m2) 4.96E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.615E-02 [2.0E-02]
Z/L AT 10 METERS -0.032 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.60E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.379E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.164E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.371E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.10E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.153 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
78%	76%	24%	22%	53%	0%	10%	59%	12%	7%	57%	42%	40%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050000  
START TIME: 2: 8:30 PST  
END TIME: 2:38:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.204	0.000	0.001	5.234	5.239	4.418	4.216	4.922	-0.098	5.344

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK W. TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
5.017	0.058	2.502	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
14.1123846	14.1124729	0.199	74	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) 0.05V	B(No.) 0.05V	(No.) 0.002V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.0	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg. True)	(Millibar)	(Milliarc)	(Celsius)	(Kelvin-M-2/3)
12.384	0.51	10.93	NO DATA	326.7	1013.71	1.37E-01	13.269	285.588

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)
12.473	7.87	10.91	NO DATA	0.09	1014.81

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.30	12.564	13.783	13.963	9.916E-03	90.85	8.057E-03	13.067	14.383	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	12.563	13.870	13.960	9.907E-03	90.17	8.043E-03	13.059	14.483	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050000  
START TIME: 2: 8:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 AT 6M	MOMENTUM FLUX (Nt/m2) -1.78E-01	DRIFTION VELOCITY (Meters/sec) 3.797E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1+Z2)/1/2]	GENERAL FORM: N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)] / (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.98E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.374E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.1E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.05E 00
Z/L AT 6M -0.008	LAT. HEAT FLUX (Watts/m2) 7.36E 01	SCALING POT. TEMP. (Kelvin) -6.374E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.48E 03
Z/L AT 10 METERS 0.006	SEN. HEAT FLUX (Watts/m2) 3.02E 00	ROUGHNESS LENGTH (Meters) 1.867E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.48E 01
Z/L AT Z1 0.911	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF. AT 10 METERS (Dimensionless) 2.47E-03		N=LnTEMP. STRUC. (Km-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.03E 01			
MONIN-ORUKHOV LENGTH (Meters) -1.628E 03	ROSEN RATIO (no units) 0.041			
PSI1 AT Z1: 0.040:13 PSI1 AT Z2: 0.028A57 PSI2 AT Z1: 0.024451 PSI2 AT Z2: 0.012481				

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1=SH25 +/- 0.0E 3 Kg/Kg.  
PTK1 PTK2 +/- 0.0B Kel.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2314
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4174E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E 05



RUN NUMBER: 7905050200  
 START TIME: 2: 8:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.462	7.95	10.91	NO DATA	1014.72	13.269	-0.806	-0.708	0.391	0.689

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.360	13.859	13.957	9.908E-03	90.25	8.045E-03	13.060	14.471	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.054 AT GMH	MOMENTUM FLUX (Nt/m2) -8.99E-02	FRICTION VELOCITY (Meters/sec) 2.702E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.298E-02	AIR DENSITY (Kg/m3) 1.2316
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.193E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.726E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4174E 02
Z/L AT GMH -0.065	LAT. HEAT FLUX (Watts/m2) 4.27E 01	SCALING POT. TEMP. (Kelvin) -2.658E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.181E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9027E 05
Z/L AT 10 METERS -0.050	SEN. HEAT FLUX (Watts/m2) 8.95E 00	ROUGHNESS LENGTH (Meters) 5.434E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.274
MONIN-OBUKHOV LENGTH (Meters) -2.001E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.155E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.155E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.53E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.92
	BOWEN RATIO (no units) 0.210			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
172%	172%	90%	154%	154%	10%	126%	308%	45%	109%	109%	65%	90%
201%	201%	46%	52%	129%	10%	39%	181%	23%	75%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050200  
 START TIME: 2: 8:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.028 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.20E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.072E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.05E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -5.676E-05 (3.0E-05)
Z/L AT GMH -0.034 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.06E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.482E-02 (2.0E-02)
Z/L AT 10 METERS -0.026 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.25E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.070E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -5.791E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.561E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.12E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.147 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
85%	83%	39%	34%	48%	0%	20%	59%	19%	11%	51%	63%	45%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050230  
START TIME: 2:38:50 PST  
END TIME: 3: 9: 0 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.REF.A 6.205	No.01 TEMP.STRUC.1 0.000	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 5.317	No.04 DEW POINT2 5.310	No.05 WIND SP1FD1 3.333	No.06 WIND SPEED2 3.187	No.07 BAR.PRES.2 4.928	No.08 SKY RAD. -0.098	No.09 WIND DIR. 5.290
No.10 BULK WT TEMP 3.623	No.11 AC FREQUENCY 3.860	No.12 AC VOLTAGE 2.502	No.13 MANUAL FLAG 0.001	No.14 ZERO REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.REF.B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 124873	No.2 AIR TEMP.2 1421 125680	UPWIND NEAR HEIGHT/LENGTH 0.199	UPWIND LAND PATH(Meters) 71	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTBFCAL (Volts) 0.000	WS1FC (Coeff.) 0.992	WS2EC (Coeff.) 0.949
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 1	DATA BASE (No. scans) 179	VOLT.REF.DEV A(No.)0.005V 0	VOLT.REF.DEV B(No.)0.005V 0	ZERO REF.DEV (No.)0.002V 0	AC VOLT.FLUX (No.)5V 0	AC FREQ.FLUX (No.)1Hz 0	AC VOLTAGE (VAC) 115.0	AC FREQUENCY (Hz) 59.86
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.487	WIND SPEED1 (Meter/sec) 6.43	DEW POINT1 (Celsius) 11.42	TEMP.STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg.True) 324.9	BAR.PRES.1 (Millibar) 1013.82	SKY RAD. (Watt/m2) 1.36E 01	BULK WT TEMP (Celsius) 13.275	MEAN AIR TEMP (Kelvin) 285.688
AIR TEMP.2 (Celsius) 12.568	WIND SPEED2 (Meter/sec) 5.99	DEW POINT2 (Celsius) 11.33	TEMP.STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.15	BAR.PRES.2 (Millibar) 1014.91			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.667	VIR.TEMP.1 (Celsius) 13.933	V.POT.TEMP.1 (Celsius) 14.113	ABS.HUMID.1 (Kg/m3) 1.024E-02	REL.HUMID.1 (Percent) 93.22	SPEC.HUMID.1 (Kg/Kg) 8.325E-03	VAP.PRES.1 (Millibar) 13.501	S.VAP.PRES.1 (Millibar) 14.482	REF.INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.658	VIR.TEMP.2 (Celsius) 14.005	V.POT.TEMP.2 (Celsius) 14.096	ABS.HUMID.2 (Kg/m3) 1.019E-02	REL.HUMID.2 (Percent) 92.17	SPEC.HUMID.2 (Kg/Kg) 8.274E-03	VAP.PRES.2 (Millibar) 13.434	S.VAP.PRES.2 (Millibar) 14.575	REF.INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050230  
START TIME: 2:38:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.014 AT GHM	MOMENTUM FLUX (Nt/m2) -6.53E-02	FRICTION VELOCITY (M/sec) 2.303E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) / (Ln(Z1/Z2) * (Z1+Z2)/2)$	GENERAL FORM: $N SLOPE = 1/(LnZ1-PSI1) - (LnZ2-PSI1) / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.57E-05	SCALING SPEC.HUMID. (Kg/Kg) -5.527E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.87E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PSI=PSI1 WS SLOPE = 1.74E 00
Z/L AT GHM 0.021	LAT. HEAT FLUX (Watts/m2) 3.87E 01	SCALING POT. TEMP. (Kelvin) 6.163E-03	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PSI=PSI2 SH SLOPE = -9.70E 03
Z/L AT 10 METERS 0.016	SEN. HEAT FLUX (Watts/m2) -1.77E 00	ROUGHNESS LENGTH (Meters) 2.889E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 9.94E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PSI=PSI2 PTK SLOPE = 8.77E 01
Z/L AT Z2 0.015	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.36E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.721E-03		N=LnTEMP.STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) 6.319E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.06E 01			
PSI1 AT Z1 = -0.136490 PSI1 AT Z2 = -0.088431 PSI2 AT Z1 = -0.184447 PSI2 AT Z2 = -0.092475	BOWEN RATIO (no units) -0.046			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2389

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(Itcal./Kg Kel.)  
2.4179E 02  
WATER LAT. HEAT VAP.  
(Itcal./Kg)  
5.9823E 05

RUN NUMBER: 7905050230  
 START TIME: 2:38:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M/2/3)	BAR. PRES. (Millibars)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.558	6.05	11.34	NO DATA	1014.82	13.275	-0.717	-0.619	0.722	0.820

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/M3)	REL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M/2/3)
10.00	12.656	13.997	14.095	1.019E-02	92.30	8.280E-03	13.443	14.564	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.115 AT GMM	MOMENTUM FLUX (Nt/m2) -4.63E-02	FRICTION VELOCITY (Meters/sec) 1.940E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.763E-02	AIR DENSITY (Kg/m3) 1.2312
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.09E-05	SCALING SPFC. HUMID. (Kg/Kg) -4.565E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.090E-05	AIR SPECIFIC HEAT (J/Kcal./Kg Kel.) 2.4179E 02
Z/L AT GMM -0.133	LAT. HEAT FLUX (Watts/m2) 2.69E 01	SCALING POT. TEMP. (Kelvin) -2.805E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.442E-03	WATER LAT. HEAT VAP. (J/Kcal./Kg) 5.9021E 05
Z/L AT 10 METERS -0.102	SEN. HEAT FLUX (Watts/m2) 6.78E 00	ROUGHNESS LENGTH (Meters) 1.354E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.282
MONIN-OBUKHOV LENGTH (Meters) -9.780E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.36E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.029E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.156E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.73E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.02
	BOWEN RATIO (no units) 0.252			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
169%	194%	101%	161%	151%	10%	115%	312%	50%	111%	100%	70%	101%
211%	211%	46%	57%	139%	10%	38%	196%	23%	80%	162%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050230  
 START TIME: 2:38:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN 1.1:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.043 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -5.23E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.054E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.22E-05 (8.0E-06)	SCALING SPFC. HUMID. (Kg/Kg) -4.969E-05 (3.0E-05)
Z/L AT GMM -0.053 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.00E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -6.935E-03 (2.0E-02)
Z/L AT 10 METERS 0.041 (0.02)	SEN. HEAT FLUX (Watts/m2) 2.68E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.936E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -2.457E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.36E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.029E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.81E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.137 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
150%	145%	17%	22%	143%	0%	4%	111%	9%	10%	88%	13%	

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050300  
START TIME: 3: 9:10 PST  
END TIME: 3:39:20 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00 VOLT. REF. A	No. 01 TEMP. STRUCT. 1	No. 02 TEMP. STRUCT. 2	No. 03 DEW POINT 1	No. 04 DEW POINT 2	No. 05 WIND SPEED 1	No. 06 WIND SPEED 2	No. 07 BAR. PRES. 2	No. 08 SKY RAD.	No. 09 WIND DIR
6.205	0.000	0.001	5.261	5.266	3.654	3.547	4.931	-0.098	4.898

No. 10 BULK WT TEMP	No. 11 AC FREQUENCY	No. 12 AC VOLTAGE	No. 13 MANUAL FLAG	No. 14 ZIRCO REF.	No. 15 SPARE A	No. 16 SPARE B	No. 17 VOLT. REF. B
3.610	3.85V	2.592	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCALPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCALPMENT CORRECTIONS:

No. 1 AIR TEMP. 1	No. 2 AIR TEMP. 2	UPWIND NEAR HEIGHT/LENGTH	UPWIND LAND PATH(Meters)	DP1FCAL (Volts)	DP2FCAL (Volts)	WTBFCAL (Volts)	WS1FC (Coeff.)	WS2EC (Coeff.)
1411 123139	1421 124026	0.183	96	-0.009	0.000	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans)	ERROR COUNT (No. scans)	DATA BASE (No. scans)	VOLT. REF. DEV A(No.).005V	VOLT. REF. DEV B(No.).005V	ZERO REF. DEV (No.).002V	AC VOLT. FLUX (No.).5V	AC FREQ. FLUX (No.).1Hz	AC VOLTAGE (VAC)	AC FREQUENCY (Hz)
0	0	180	0	0	0	0	0	115.0	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCALPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius)	WIND SPEED 1 (Meter/sec)	DEW POINT 1 (Celsius)	TEMP. STRUCT. 1 (Kel.xM-2/3)	WIND DIR. (Deg. True)	BAR. PRES. 1 (Millibar)	SKY RAD. (Watt/m2)	BULK WT TEMP (Celsius)	MEAN AIR TEMP (Kelvin)
12.314	7.05	11.09	NO DATA	311.5	1013.86	1.37E 01	13.262	285.518

AIR TEMP. 2 (Celsius)	WIND SPEED 2 (Meter/sec)	DEW POINT 2 (Celsius)	TEMP. STRUCT. 2 (Kel.xM-2/3)	TIDE TABLE (Meter MSL)	BAR. PRES. 2 (Millibar)
12.403	6.67	11.07	NO DATA	0.19	1014.96

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters)	POT. TEMP. 1 (Celsius)	VIR. TEMP. 1 (Celsius)	V. POT. TEMP. 1 (Celsius)	ABS. HUMID. 1 (Kg/m3)	REL. HUMID. 1 (Percent)	SPEC. HUMID. 1 (Kg/Kg)	VAP. PRES. 1 (Millibar)	S. VAP. PRES. 1 (Millibar)	REF. INDEX 1 (Kel.xM-2/3)
18.35	12.494	13.727	13.907	1.003E-02	92.26	8.144E-03	13.210	14.319	NO DATA

HEIGHT, Z2 (Meters)	POT. TEMP. 2 (Celsius)	VIR. TEMP. 2 (Celsius)	V. POT. TEMP. 2 (Celsius)	ABS. HUMID. 2 (Kg/m3)	REL. HUMID. 2 (Percent)	SPEC. HUMID. 2 (Kg/Kg)	VAP. PRES. 2 (Millibar)	S. VAP. PRES. 2 (Millibar)	REF. INDEX 2 (Kel.xM-2/3)
9.20	12.493	13.814	13.904	1.002E-02	91.55	8.179E-03	13.200	14.418	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050300  
START TIME: 3: 9:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, +=Unstable) -0.018 AT GMM	MOMENTUM FLUX (Nt/m2) -6.65E-02	FRICTION VELOCITY (Meters/sec) 2.324E-01	GENERAL FORM DN/DZ= [ (N1-N2) ] / [ 1 + (Z1/Z2) ] (Z1+Z2)1/21	GENERAL FORM: N SLOPE= [ (LnZ1-PS1) - (LnZ2-PS1) ] [ (N1-N2) ]
GEOMETRIC MEAN HEIGHT (Meter) GMM: (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.88E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.557E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.15E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 1.72E 00
Z/L AT GMM 0.023	LAT. HEAT FLUX (Watts/m2) 4.64E 01	SCALING POT. TEMP. (Kelvin) -6.557E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -8.24E 03
Z/L AT 10 METERS -0.017	SEN. HEAT FLUX (Watts/m2) 1.90E 00	ROUGHNESS LENGTH (Meters) 2.995E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -1.24E 01
Z/L AT Z2 0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.40E 03		N=LNTMP. STRUC. (Kel.xM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MONIN BRUKHOFF LENGTH (Meters) 5.747E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.20E 01			
PS11 AT Z1= 0.105166 PS11 AT Z2= 0.056804 PS12 AT Z1= 0.065148 PS12 AT Z2= 0.034718	ROMEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec.2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- 0.0E-3 Kg/Kg  
PTK1-PTK2= +/- 0.008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2318

AIR SPECIFIC HEAT  
(Jtcal./Kg kel.)  
2.4176E 02

WATER LAT. HEAT VAP.  
(Jtcal./Kg)  
5.9032E 05

RUN NUMBER: 7905050300  
 START TIME: 3: 9:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.392	6.72	11.07	NO DATA	1014.86	13.262	-0.870	-0.772	0.542	0.640

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.490	13.884	13.902	1.002E-02	91.64	8.131E-03	13.202	14.407	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.097 AT GMH	MOMENTUM FLUX (Nt/m2) -5.97E-02	FRICTION VELOCITY (Meters/sec) 2.201E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.845E-02	AIR DENSITY (Kg/m3) 1.2321
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.36E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.016E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.360E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4176E 02
Z/L AT GMH -0.113	LAT. HEAT FLUX (Watts/m2) 3.36E 01	SCALING POT. TEMP. (Kelvin) -3.076E-02	WITH POT. TEMPERATURE (Meter Kel /sec) 6.771E-03	WATER LAT. HEAT VAP. (J/cal./Kg) 5.9031E 05
Z/L AT 10 METERS -0.087	SEN. HEAT FLUX (Watts/m2) 8.44E 00	ROUGHNESS LENGTH (Meters) 2.387E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.270
MONIN-OBUKHOV LENGTH (Meters) -1.148E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.073E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.155E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.57E 01			BAR. PRES. AT WT LEVEL (Millibar) 1016.06
	BOWEN RATIO (no units) 0.251			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
203%	203%	126%	174%	174%	10%	131%	348%	63%	111%	111%	83%	126%
195%	195%	46%	74%	123%	10%	38%	177%	23%	77%	146%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050300  
 START TIME: 3: 9:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.058 [0.021] AT GMH	MOMENTUM FLUX (Nt/m2) -6.15E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.234E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec m2) 1.48E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.646E-05 [3.0E-05]
Z/L AT GMH -0.069 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.66E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.704E-02 [2.0E-02]
Z/L AT 10 METERS -0.053 [0.02]	SEN. HEAT FLUX (Watts/m2) 5.74E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.595E-05 [6.0E-05]
MONIN OBUKHOV LENGTH (Meters) -1.882E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.157E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.71E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.180 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
66%	66%	6%	20%	58%	0%	6%	61%	3%	14%	61%	5%	17%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050330  
START TIME: 3:39:30 PST  
END TIME: 4: 9:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.152	5.164	4.401	4.253	4.919	0.099	5.076
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.568	3.864	2.503	0.001	0.001	0.001	0.001	6.204		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED (ESCAPMENT) CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	DP3FCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HFIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121892	1421 122812	0.183	94	-0.009	0.000	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 15V)	(No. 1Hz)	(V)	(Hz)
0	1	179	0	0	0	0	0	115.0	17.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(MilliBar)	(Celsius)	(Celsius)
12.189	8.48	10.44	NO DATA	317.6	1013.68	1.38E-01	13.421	12.535
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.281	7.97	10.46	NO DATA	0.22	1014.78			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.369	13.542	13.722	9.605E-03	89.08	7.797E-03	12.648	14.199	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.371	13.636	13.726	9.620E-03	88.62	7.804E-03	12.673	14.301	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050330  
START TIME: 3:39:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -1.18E-01	FRICTION VELOCITY (Meters/sec) 3.100E-01	GENERAL FORM: DN/DZ = (N1-N2)/(1+ln(Z1/Z2))	GENERAL FORM: N SLOPE = (1+ln(Z1/Z2)) - (1+ln(Z2/Z1))
GEOMETRIC MEAN HEIGHT (Meters) GMM = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.46E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.429E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 5.71E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.29E-00
Z/L AT GMM -0.012	LAT. HEAT FLUX (Watts/m2) 6.07E-01	SCALING POT. TEMP. (Kelvin) -6.429E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.41E-03
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 2.48E-00	ROUGHNESS LENGTH (Meters) 9.058E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.41E-01
Z/L AT Z1 -0.017	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.38E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.0E-01		N=LAT. HEAT FLUX (Watts/m2) Z=HEIGHT (M) Vert. Axis PSI=PSI1 LT SLOPE = NO DATA
Z/L AT Z2 -0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.70E-01			
MONIN-OBUKHOV LENGTH (Meters) -1.065E-03	BOWEN RATIO (No. units) 0.041			
PSI1 AT Z1 = 0.059990 PSI1 AT Z2 = 0.031168 PSI2 AT Z1 = 0.036697 PSI2 AT Z2 = 0.018897				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF. (No units)	BULK MOISTURE TRANSF. COEF. (No units)
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed. Insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.  
PTK1-PTK2 = +/- .00E Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2323

AIR SPECIFIC HEAT  
(J/Kel. Kg)  
2.416E-02

WATER LAT. HEAT VAP.  
(J/Kel. Kg)  
2.439E-04

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905050330  
 START TIME: 3:39:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.270	8.03	10.46	NO DATA	1014.68	13.221	-0.951	-0.853	0.403	0.501

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M-2/3)
10.00	12.368	13.624	13.722	9.619E-03	88.67	7.803E-03	12.670	14.289	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.068 AT GMH	MOMENTUM FLUX (Nt/m2) -9.21E-02	FRICTION VELOCITY (Meters/sec) 2.734E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.476E-02	AIR DENSITY (Kg/m3) 1.2326
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.02E-05	SCALING SPEC.HUMID. (Kg/Kg) -5.980E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.015E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH -0.072	LAT.HEAT FLUX (Watts/m2) 4.98E 01	SCALING POT.TEMP. (Kelvin) -3.036E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.300E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9037E 05
Z/L AT 10 METERS -0.056	SEN.HEAT FLUX (Watts/m2) 1.04E 01	ROUGHNESS LENGTH (Meters) 5.688E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.226
MONIN-OBUKHOV LENGTH (Meters) -1.794E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.38E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.160E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.152E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.39E 01			BAR.PRES.AT WT LEVEL (Millibar) 1015.88
	BOWEN RATIO (no units) 0.208			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
190%	190%	110%	165%	165%	10%	130%	330%	55%	110%	110%	75%	110%
189%	189%	46%	49%	117%	10%	37%	166%	23%	72%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050330  
 START TIME: 3:39:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.035 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -9.99E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.842E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.12E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -6.158E-05 [3.0E-05]
Z/L AT GMH -0.042 [0.02]	LAT.HEAT FLUX (Watts/m2) 5.23E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.698E-02 [2.0E-02]
Z/L AT 10 METERS -0.033 [0.02]	SEN.HEAT FLUX (Watts/m2) 7.09E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.916E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.064E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.38E 01 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 1.294E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.44E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.152 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
73%	71%	14%	12%	56%	0%	2%	58%	7%	4%	60%	25%	21%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905050400  
START TIME: 4: 9:50 PST  
END TIME: 4:40: 0 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOL):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.122	5.135	4.813	4.625	4.911	0.098	5.212
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. REF. B		
5.549	3.072	2.503	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	WTR CAL	WS1 CAL	WS2 CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 12:1870	1421 12:0023	0.199	67	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	CHUNK COUNT	DATA BASE	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. counts)	(No. counts)	(No. counts)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS.

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.187	9.27	10.27	NO DATA	322.2	1013.56	1.37E-01	13.193	285.395
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)			
12.282	8.62	10.20	NO DATA	0.24	1014.65			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	12.367	13.524	13.704	9.490E-03	88.04	7.705E-03	12.497	14.195	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	12.372	13.621	13.711	9.507E-03	87.58	7.713E-03	12.524	14.300	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050400  
START TIME: 4: 9:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
(KAD, RICHARDSON NUMBER (+=Stable, -=Unstable) -0.006 AT GMM	MOMENTUM FLUX (Nt/m2) -1.83E-01	FRICTION VELOCITY (Meters/sec) 3.851E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) * 1/Ln(Z1/Z2) * (Z1+Z2)^{1/2}$	GENERAL FORM: $N' SLOPE = 1/(Ln(Z1-PS1) - Ln(Z2-PS1)) * (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meters) GMM = $(Z1+Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kq/sec m2) 3.02E-05	SCALING SPEC. HUMID. (Kq/Kg) -6.371E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.21E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.04E-00
Z/L AT GMM 0.008	LAT. HEAT FLUX (Watts/m2) 7.47E-01	SCALING POT. TEMP. (Kelvin) -6.371E-03	N=SPEC HUMIDITY (Kq/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC HUMIDITY (Kq/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.40E-03
Z/L AT 10 METERS -0.006	SLN. HEAT FLUX (Watts/m2) 3.06E-00	ROUGHNESS LENGTH (Meters) 1.961E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.40E-01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.10E-03		N=Ln TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONI CTP SLOPE=NO DATA
Z/L AT Z2 -0.005	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.15E-01			
MONIN-ORUKHOV LENGTH (Meters) -1.674E-03	HOMEN RATIO (no units) 0.041			
PS11 AT Z1 = 0.039142 PS11 AT Z2 = 0.028094 PS12 AT Z1 = 0.021792 PS12 AT Z2 = 0.012139				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2323
AIR SPECIFIC HEAT (J/cal./Kg. Kel.) 2.4167E-02
WATER LAT. HEAT VAP (J/cal./Kg.) 5.9039E-05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-03 Kq/Kg.  
PTK1-PTK2 = +/- .00E-01 Kel.



RUN NUMBER: 7905050400  
 START TIME: 4: 9:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. x M-2/3) NO DATA	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.271	8.70	10.28		1014.56	13.193	-0.922	-0.824	0.416	0.514

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. x M-2/3)
10.00	12.369	13.609	13.707	9.505E-03	87.63	7.712E-03	12.521	14.288	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.046 AT GMM	MOMENTUM FLUX (Nt/m2) -1.12E-01	FRICTION VELOCITY (Meters/sec) 3.019E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.114E-02	AIR DENSITY (Kg/m3) 1.2325
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.153E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.289E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -0.056	LAT. HEAT FLUX (Watts/m2) 5.66E 01	SCALING POT. TEMP. (Kelvin) -2.847E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.594E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9037E 05
Z/L AT 10 METERS -0.043	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 8.226E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.196
MONIN-OBUKHOV LENGTH (Meters) -2.332E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.204E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.150E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.10E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.76
	BOWEN RATIO (no units) 0.189			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
177%	177%	96%	157%	157%	10%	129%	314%	48%	109%	109%	68%	96%
191%	191%	46%	48%	119%	10%	37%	167%	23%	71%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050400  
 START TIME: 4: 9:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -1.35E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.289E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.46E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.239E-05 (3.0E-05)
Z/L AT GMM 0.031 (0.02)	LAT. HEAT FLUX (Watts/m2) 6.08E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.599E-02 (2.0E-02)
Z/L AT 10 METERS -0.024 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.42E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.264E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.208E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.37E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.470E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.34E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.138 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
79%	78%	28%	17%	52%	0%	7%	56%	13%	2%	56%	46%	33%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905050430  
START TIME: 4:40:10 PST  
END TIME: 5:10:20 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.122	5.131	5.044	4.811	4.910	-0.007	5.246

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.516	3.791	2.503	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	WTB CAL	WS11C	WS21C
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 122308	1421 121238	0.197	67	0.009	0.000	0.000	0.992	0.944

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	17.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
12.231	9.71	10.27	NO DATA	323.4	1013.54	1.21E 01	13.171	285.437

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.324	8.96	10.26	NO DATA	0.24	1014.64

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.411	13.568	13.748	9.489E-03	87.79	7.705E-03	12.498	14.236	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.414	13.661	13.751	9.493E-03	87.23	7.703E-03	12.508	14.339	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050430  
START TIME: 4:40:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.004 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -2.42E-01	FRICTION VELOCITY (Meters/sec) 4.435E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N/SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 3.47E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.344E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 8.35E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 9.02E-01
Z/L AT GMH -0.006	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 8.57E 01	SCALING POT. TEMP. (Kelvin) -6.344E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.52E 03
Z/L AT 10 METERS -0.004	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 3.51E 00	ROUGHNESS LENGTH (Meters) 3.199E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.52E 01
Z/L AT Z1 -0.009	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.21E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.522E-03		N=LAT. HEAT FLUX (Watts/m <sup>2</sup> ) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -2.240E 03	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.01E 02			
PS11 AT Z1 = 0.029612 PS11 AT Z2 = 0.015116 PS12 AT Z1 = 0.017945 PS12 AT Z2 = 0.009117	BOWEN RATIO (no units) 0.041			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> )
1.2321

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

AIR SPECIFIC HEAT (J/Kel. Kg Kel.)
2.4166E 02

WATER LAT. HEAT VAP. (J/Kel. Kg)
5.9037E 05

RUN NUMBER: 7905050430  
 START TIME: 4:40:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.313	9.05	10.26	NO DATA	1014.54	13.171	-0.859	-0.761	0.479	0.577

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.411	13.650	13.748	9.493E-03	87.30	.703E-03	12.507	14.327	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable,-=Unstable) -0.038 AT GMH	MOMENTUM FLUX (Nt/m2) -1.24E-01	FRICTION VELOCITY (Meters/sec) 3.171E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.006E-01	AIR DENSITY (Kg/m3) 1.2323
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.38E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.085E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.378E-05	AIR SPECIFIC HEAT (JCal./Kg Kel.) 2.4166E 02
Z/L AT GMH -0.047	LAT.HEAT FLUX (Watts/m2) 5.88E 01	SCALING POT.TEMP. (Kelvin) -2.628E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.333E-03	WATER LAT.HEAT VAP. (JCal./Kg) 5.9035E 05
Z/L AT 10 METERS -0.036	SEN.HEAT FLUX (Watts/m2) 1.04E 01	ROUGHNESS LENGTH (Meters) 9.840E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.174
MONIN-OBUKHOV LENGTH (Meters) -2.788E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.21E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.227E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.148E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.13E 01			BAR.PRES.AT WT LEVEL (Millibar) 1015.74
	BOWEN RATIO (no units) 0.177			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL SPEC HUMIDITY	SCL POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
170%	170%	87%	152%	152%	11%	129%	305%	44%	109%	109%	64%	87%
196%	196%	46%	48%	124%	11%	38%	172%	23%	71%	142%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050430  
 START TIME: 4:40:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable,-=Unstable) -0.020 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.65E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.607E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.64E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -6.187E-05 [3.0E-05]
Z/L AT GMH -0.025 [0.02]	LAT.HEAT FLUX (Watts/m2) 6.52E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.483E-02 [2.0E-02]
Z/L AT 10 METERS -0.019 [0.02]	SEN.HEAT FLUX (Watts/m2) 7.31E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.877E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -5.249E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.21E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.634E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.54E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.128 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL SPEC HUMIDITY	SCL POT TEMP	ROUGH LENGTH	DRAW COEF.
84%	79%	38%	23%	47%	0%	13%	55%	18%	2%	50%	60%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050500  
START TIME: 5:10:30 PST  
END TIME: 5:40:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.083	5.094	5.757	5.466	4.923	0.150	5.306

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.508	3.695	2.504	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411	123069	1421	123905	0.199	68	-0.009	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.69

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.307	11.08	10.03	NO DATA	325.4	1013.73	-2.09E 01	13.155	285.509

AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.391	10.16	10.04	NO DATA	0.22	1014.83

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.487	13.623	13.803	9.340E-03	85.99	7.584E-03	12.305	14.310	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.481	13.708	13.798	9.352E-03	85.56	7.588E-03	12.324	14.405	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050500  
START TIME: 5:10:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.003 AT GMH	MOMENTUM FLUX (Nt/m2) -3.59E-01	FRICTION VELOCITY (Meters/sec) 5.394E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(L*Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LN(Z1-PSI1)-(LN(Z2-PSI1))]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.2E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.318E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 1.02E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 7.42E-01
Z/L AT GMH -0.004	LAT. HEAT FLUX (Watts/m2) 1.04E 02	SCALING POT. TEMP. (Kelvin) -6.318E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.56E 03
Z/L AT 10 METERS -0.003	SEN. HEAT FLUX (Watts/m2) 4.25E 00	ROUGHNESS LENGTH (Meters) 6.200E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.56E 01
Z/L AT Z1 -0.005	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.09E 01	DRAW COEF. AT 10 METERS (Dimensionless) 2.799E-03		N=LNTEMP. STRUC. (KxM 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.003	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.72E 01			
MONIN-OBUKHOV LENGTH (Meters) -3.343E 03	BOWEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.020077 PSI1 AT Z2 = 0.010190 PSI2 AT Z1 = 0.012129 PSI2 AT Z2 = 0.006136				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (m/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2321

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

AIR SPECIFIC HEAT (Jcal./Kg Kel.)
2.4164E 02

WATER LAT. HEAT VAP (Jcal./Kg)
5.9033E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905050500  
 START TIME: 5:10:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.380	10.27	10.04	NO DATA	1014.73	13.155	-0.775	-0.677	0.543	0.641

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.478	13.698	13.796	9.351E-03	85.61	7.588E-03	12.322	14.394	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.023 AT GMH	MOMENTUM FLUX (Nt/m2) -1.70E-01	FRICTION VELOCITY (Meters/sec) 3.714E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.379E-01	AIR DENSITY (Kg/m3) 1.2324
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.88E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.289E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.878E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.029	LAT. HEAT FLUX (Watts/m2) 7.11E 01	SCALING POT. TEMP. (Kelvin) -2.260E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.391E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9031E 05
Z/L AT 10 METERS 0.022	SEN. HEAT FLUX (Watts/m2) 1.05E 01	ROUGHNESS LENGTH (Meters) 1.727E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.161
MONIN-OBUKHOV LENGTH (Meters) -4.447E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.09E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.308E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.147E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.07E 01			BAR. PRES. AT WT LEVEL (Millibar) 1015.93
	ROMEN RATIO (no units) 0.147			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
165%	165%	82%	149%	149%	8%	120%	298%	41%	108%	108%	61%	82%
204%	204%	46%	47%	132%	8%	35%	179%	23%	70%	155%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050500  
 START TIME: 5:10:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.012 [0.021 AT GMH]	MOMENTUM FLUX (Nt/m2) -2.38E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.320E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.19E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.300E-05 [3.0E-05]
Z/L AT GMH -0.015 [0.021]	LAT. HEAT FLUX (Watts/m2) 7.89E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.302E-02 [2.0E-02]
Z/L AT 10 METERS 0.012 [0.021]	SEN. HEAT FLUX (Watts/m2) 7.55E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.580E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 0.544E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.09E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.798E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.67E 01 [3.0E+01]	
	ROMEN RATIO (no units) 0.107 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
51%	49%	41%	23%	41%	0%	23%	51%	20%	0%	41%	63%	44%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050530  
START TIME: 5:40:50 PST  
END TIME: 6:10:50 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR
6.205	0.000	0.001	5.079	5.087	5.870	5.554	4.946	0.768	5.316

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.494	3.862	2.505	0.001	0.001	0.001	0.001	6.204

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	UPWIND CAL	DOWNWIND CAL	WIND CAL	WIND CAL
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)
1411 124056	1421 124768	0.199	70	-0.009	0.000	0.000	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.0	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/M2)	(Celsius)	(Kel.xM-2/3)
12.406	11.29	10.01	NO DATA	375.7	1014.09	-1.07E-02	13.149	285.641

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.477	10.32	10.00	NO DATA	0.18	1015.19

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/M3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.585	13.720	13.900	9.326E-03	85.30	7.573E-03	12.290	14.409	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/M3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.567	13.791	13.841	9.324E-03	84.83	7.567E-03	12.294	14.492	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050530  
START TIME: 5:40:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD.RICHARDSON NUMBR (+Stable, -Unstable) 0.006 AT GHM	MOMENTUM FLUX (Nt/m2) -3.62E-01	FRICTION VELOCITY (Meters/sec) 5.423E-01	GENERAL FORM: DN/DZ= [(N1-N2)/Ln(Z1/Z2)] (Z1=Z2)1/2	GENERAL FORM: N SLOPE= [(LnZ1-PS1)-(LnZ2-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.97E-05	SCALING SPEC.HUMID. (Kg/Kg) -5.945E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.08E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PS1=PS11 WS SLOPE= 7.38E-01
Z/L AT GHM 0.008	LAT.HEAT FLUX (Watts/m2) 9.82E 01	SCALING POT. TEMP. (Kelvin) 1.369E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PS1=PS12 SH SLOPE= -9.09E 03
Z/L AT 10 METERS 0.006	SEN.HEAT FLUX (Watts/m2) -9.25E 00	ROUGHNESS LENGTH (Meters) 6.308E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= 2.05E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PS1=PS12 PTK SLOPE= 3.95E 01
Z/L AT Z1 0.012	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.07E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.712E 05		
Z/L AT Z2 0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.82E 01			
MONIN-OBUKHOV LENGTH (Meters) 1.575E 03	ROSEN RATIO (no units) -0.094			N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PS1=NONE CT2 SLOPE=NO DATA
PS11 AT Z1= -0.054772 PS11 AT Z2= -0.027461 PS12 AT Z1= -0.074017 PS12 AT Z2= -0.037109				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/M3) 1.2321
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9028E 05

RUN NUMBER: 790505030  
 START TIME: 5:40:50 PST  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U.POT-WT TEMP (Kelvin)
12.468	10.44	10.00	NO DATA	1015.09	13.149	-0.681	-0.583	0.633	0.731

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	U.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.566	13.782	13.880	9.327E-03	84.89	7.567E-03	12.294	14.482	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.019 AT GMH	MOMENTUM FLUX (Nt/m2) -1.77E-01	FRICTION VELOCITY (Meters/sec) 3.791E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.437E-01	AIR DENSITY (Kg/m3) 1.2324
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.96E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.333E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.959E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
Z/L AT GMH -0.025	LAT.HEAT FLUX (Watts/m2) 7.31E 01	SCALING POT.TEMP. (Kelvin) -2.004E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.596E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9026E 05
Z/L AT 10 METERS -0.019	SEN.HEAT FLUX (Watts/m2) 9.47E 00	ROUGHNESS LENGTH (Meters) 1.856E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.161
MONIN-OBUKHOV LENGTH (Meters) -5.227E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.07E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.319E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.147E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.45E 01			BAR.PRES.AT WT LEVEL (Millibar) 1016.29
	BOWEN RATIO (no units) 0.130			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
106%	112%	74%	143%	86%	6%	65%	229%	37%	106%	49%	57%	74%
216%	216%	46%	47%	144%	6%	20%	190%	23%	70%	167%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 790505030  
 START TIME: 5:40:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.002 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.48E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.417E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.21E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) -6.179E-05 (3.0E-05)
Z/L AT GMH -0.003 (0.02)	LAT.HEAT FLUX (Watts/m2) 7.93E 01 (2.0E+01)	SCALING POT.TEMP. (Kelvin) 5.998E-03 (2.0E-02)
Z/L AT 10 METERS -0.002 (0.02)	SEN.HEAT FLUX (Watts/m2) -2.24E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.772E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.251E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.07E 02 (2.0E+01)	DRAW COEF.AT 10 METERS (Meters) 1.601E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.39E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.028 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
67%	67%	38%	18%	322%	0%	12%	140%	19%	3%	96%	68%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050600  
START TIME: 6:11: 0 PST  
END TIME: 6:41: 0 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. P.	SKY RAD.	WIND DIR.
0.000	0.000	0.001	5.125	5.130	5.507	5.187	4.9%	1.570	5.349

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
5.132	5.889	2.508	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	DP2FCAL	DP2FCAL	WTF2CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.125434	1421.126857	0.199	73	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

ANALOG FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	150	0	0	0	0	0	115.1	59.89

## \* DERIVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.548	10.60	10.29	NO DATA	326.9	1014.51	-2.19E 02	13.166	285.737

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.505	9.65	10.25	NO DATA	0.11	1015.61

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
10.35	12.728	13.889	14.068	9.499E-03	86.08	7.715E-03	12.525	14.550	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.25	12.696	13.943	14.033	9.488E-03	85.58	7.699E-03	12.512	14.621	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050600  
START TIME: 6:11: 0 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.011 AT GMH	MOMENTUM FLUX (Nt/m2) -3.23E-01	FRICTION VELOCITY (Meters/sec) 5.120E-01	GENERAL FORM: DN/DZ = 1/(N1-N2) * [Ln(Z1/Z2)] * (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
MONOTRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.59E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.689E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.06E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 7.81E-01
Z/L AT GMH 0.016	LAT. HEAT FLUX (Watts/m2) 8.67E 01	SCALING POT. TEMP. (Kelvin) 2.304E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.50E 03
Z/L AT 10 METERS 0.012	SIN. HEAT FLUX (Watts/m2) -1.47E 01	ROUGHNESS LENGTH (Meters) 5.210E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 3.61E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 2.35E 01
Z/L AT Z1 0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.19E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.775E-03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.011	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.45E 02			
MONIN-BUKHOV LENGTH (Meters) 8.345E 02	BOWEN RATIO (no units) -0.166			
PSI1 AT Z1 = -0.103354 PSI1 AT Z2 = -0.051818 PSI2 AT Z1 = -0.139667 PSI2 AT Z2 = -0.070024				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (m/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2319

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2 4166E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9020E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905050600  
 START TIME: 6:11: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.599	9.76	10.26	NO DATA	1015.51	13.166	-0.568	-0.470	0.770	0.868

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.697	13.937	14.035	9.489E-03	85.64	7.701E-03	12.514	14.613	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.021 AT GMH	MOMENTUM FLUX (Nt/m2) -1.50E-01	FRICTION VELOCITY (Meters/sec) 3.485E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.215E-01	AIR DENSITY (Kg/m3) 1.2323
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.58E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.006E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.580E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.416AE 02
Z/L AT GMH -0.026	LAT. HEAT FLUX (Watts/m2) 6.37E 01	SCALING POT. TEMP. (Kelvin) -1.784E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.218E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -0.020	SEN. HEAT FLUX (Watts/m2) 7.75E 00	ROUGHNESS LENGTH (Meters) 1.380E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.184
MONIN-OBUKHOV LENGTH (Meters) -4.965E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.19E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.274E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.149E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.47E 02			BAR. PRES. AT WT LEVEL (Millibar) 1016.71
	BOWEN RATIO (no units) 0.122			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
84%	94%	70%	140%	65%	5%	39%	205%	35%	105%	30%	55%	70%
236%	236%	46%	48%	164%	5%	12%	212%	23%	71%	187%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050600  
 START TIME: 6:11: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.003 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.18E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.134E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.84E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -5.879E-05 [3.0E-05]
Z/L AT GMH 0.004 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.01E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 1.745E-02 [2.0E-02]
Z/L AT 10 METERS 0.003 [0.02]	SEN. HEAT FLUX (Watts/m2) -0.37E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.062E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 3.485E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.19E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.811E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.47E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.025 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
87%	88%	40%	20%	146%	0%	1%	180%	20%	3%	126%	63%	43%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905050630  
START TIME: 6:41:10 PST  
END TIME: 7:11:10 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.265	0.000	0.001	5.127	5.129	5.070	5.538	4.985	2.149	5.418
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.545	3.903	2.509	0.001	0.001	0.001	0.001	6.265		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTFCAL	WS1FC	WS2FC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126233	1421 126843	0.199	77	-0.009	0.000	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DRV	ZERO REF.DLV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.673	11.29	10.30	NO DATA	329.2	1014.68	-3.00E 02	13.199	285.814
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.684	10.29	10.25	NO DATA	0.03	1015.78			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.883	13.965	14.145	9.505E-03	85.72	7.721E-03	12.537	14.624	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.775	14.022	14.112	9.482E-03	85.09	7.694E-03	12.508	14.699	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050630  
START TIME: 6:41:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STARTILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -3.71E-01	FRICTION VELOCITY (Meters/sec) 5.492E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1+Z2)/2]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.93E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.805E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.12E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 7.28E-01
Z/L AT GMM 0.012	LAT. HEAT FLUX (Watts/m2) 9.70E 01	SCALING POT. TEMP. (Kelvin) 2.074E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -9.31E 03
Z/L AT 10 METERS 0.009	SEN. HEAT FLUX (Watts/m2) -1.42E 01	ROUGHNESS LENGTH (Meters) 6.576E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 3.19E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= 2.61F 01
Z/L AT Z1 0.017	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.00E 02	DRAG COEF. AT 10 METERS (Dimensionless) 2.701E-04	N=LnTEMP.STRUC (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE	CT2 SLOPE=NO DATA
Z/L AT Z2 0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.17E 02			
MONIN-OBUKHOV LENGTH (Meters) 1.067E 03	ROSEN RATIO (no units) -0.146			
PS11 AT Z1= -0.080853 PS11 AT Z2= -0.040537 PS12 AT Z1= -0.109261 PS12 AT Z2= -0.054779				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	1.2318
AIR SPECIFIC HEAT (ITcal./Kg Kel.)	2.4166E 02
WATER LAT. HEAT VAP. (ITcal./Kg)	5.9016E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905050630  
 START TIME: 6:41:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: ALL CHANNELS: 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
12.677	10.41	10.25	NO DATA	1015.68	13.199	-0.522	-0.424	0.816	0.914

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S-VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.775	14.015	14.113	9.485E-03	85.17	7.698E-03	12.512	14.691	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.016 AT GMH	MOMENTUM FLUX (Nt/m2) -1.76E-01	FRICTION VELOCITY (Meters/sec) 3.778E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.428E-01	AIR DENSITY (Kg/m3) 1.2322
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.79E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.995E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.791E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4166E 02
Z/L AT GMH -0.020	LAT. HEAT FLUX (Watts/m2) 6.90E 01	SCALING POT. TEMP. (Kelvin) -1.603E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.057E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9014E 05
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m2) 7.55E 00	ROUGHNESS LENGTH (Meters) 1.835E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.219
MONIN-OBUKHOV LENGTH (Meters) -6.496E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.00E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.317E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.152E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.23E 02			BAR. PRES. AT WT LEVEL (Millibar) 1016.88
	BOWEN RATIO (no units) 0.109			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP	ROUGH LENGTH	DRAW COEF
88%	96%	70%	140%	68%	5%	33%	209%	35%	105%	33%	5%	78%
248%	248%	46%	48%	176%	5%	10%	224%	23%	71%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050630  
 START TIME: 6:41:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: ALL CHANNELS: 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.002 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.53E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.455E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.08E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -5.919E-05 (3.0E-05)
Z/L AT GMH 0.003 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.61E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.558E-02 (2.0E-02)
Z/L AT 10 METERS 0.002 (0.02)	SEN. HEAT FLUX (Watts/m2) -8.12E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.911E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 4.050E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.00E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.847E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.22E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.023 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP	ROUGH LENGTH	DRAW COEF
67%	68%	39%	21%	146%	0%	2%	160%	20%	2%	113%	61%	

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050700  
START TIME: 7:11:20 PST  
END TIME: 7:41:20 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.295	0.000	0.001	5.152	5.152	5.699	5.372	4.992	2.926	5.403
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQ	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
5.577	3.862	2.511	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126586	1411 127272	0.199	81	-0.009	0.000	0.000	0.992	0.949

## \* DIGITAL HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.)(.005V)	B(No.)(.005V)	(No.)(.002V)	(No.)(5V)	(No.)(1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin-2/3)
12.659	10.96	10.44	NO DATA	328.7	1014.79	-4.08E 02	13.230	285.853
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.727	9.99	10.39	NO DATA	-0.6A	1015.89			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.838	14.014	14.193	9.599E-03	86.36	7.797E-03	12.661	14.660	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.817	14.077	14.167	9.570E-03	85.65	7.767E-03	12.627	14.742	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050700  
START TIME: 7:11:20 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
LOAD RICHARDSON NUMBER (+Stable, -Unstable)	MOMENTUM FLUX (Nt/m2)	FRICTION VELOCITY (Meters/sec)	GENERAL FORM: $DN/DZ = (N1-N2)/(Ln(Z1/Z2))$	GENERAL FORM: $N' SLOPE = (Ln(Z1-PSI1) - Ln(Z2-PSI1))/(N1-N2)$
0.007 AT GMH	-3.61E-01	5.416E-01		
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$	HUMIDITY FLUX (Kg/sec m2)	SCALING SPEC. HUMID. (Kg/Kg)	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.09E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.38E-01
12.99	3.94E-05	-5.904E-05		
Z/L AT GMH	LAT. HEAT FLUX (Watts/m2)	SCALING POT. TEMP. (Kelvin)	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 5.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.15E 03
0.007	9.73E 01	1.555E-02		
Z/L AT Z1	SEN. HEAT FLUX (Watts/m2)	ROUGHNESS LENGTH (Meters)	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 2.35E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 3.41E 01
0.015	-1.05E 01	6.284E-04		
Z/L AT Z2	SKY AND SOLAR HEAT FLUX (Watts/m2)	DRAW COEFF. AT 10 METERS (Dimensionless)		
0.007	4.08E 02	2.085E-03		
MONIN-ORUKHOV LENGTH (Meters)	TOTAL HEAT BUDGET FLUX (Watts/m2)			N=Ln(TEMP. STRUCT. (KxM-2/3)) Z=HEIGHT (M) Vert. Axis PSI=NOH CT2 SLOPE=NO DATA
1.385E 03	-3.21E 02			
PSI1 AT Z1= -0.042290 PSI1 AT Z2= -0.031240 PSI2 AT Z1= -0.084175 PSI2 AT Z2= -0.042292	ROMEN RATIO (no units)			
	-0.108			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92F-03	1.32F-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2317

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .001-3 Kg/Kg.

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4168E 02

WATER LAT. HEAT VAP  
(Jcal./Kg)  
5.9014E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905050700  
 START TIME: 7:11:20 PST  
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MARINE SURFACE LAYER  
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 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.719	10.11	10.39	NO DATA	1015.79	13.230	-0.511	-0.413	0.839	0.937

HEIGHT (Meters)	POT TEMP (Celsius)	VIR TEMP (Celsius)	V.POT TEMP (Celsius)	ABS HUMID. (Kg/m3)	REL HUMID. (Percent)	SPEC HUMID. (Kg/Kg)	VAP PRES. (Millibars)	S VAP PRES. (Millibars)	REF INDEX (Kelvin-M-2/3)
10.00	12.817	14.070	14.168	9.574E-03	85.74	7.771E-03	12.631	14.733	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD RICHARDSON NUMBER (+Stable, -Unstable) -0.017 AT GMH	MOMENTUM FLUX (Nt/m2) -1.63E-01	FRICTION VELOCITY (Meters/sec) 3.639E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.324E-01	AIR DENSITY (Kg/m3) 1.2321
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.62E-05	SCALING SPEC HUMID. (Kg/Kg) -5.847E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.622E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.022	LAT. HEAT FLUX (Watts/m2) 6.48E 01	SCALING POT. TEMP. (Kelvin) -1.605E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.841E-03	WATER LAT. HEAT VAP (ITcal./Kg) 5.9012E 05
Z/L AT 10 METERS -0.017	SEN. HEAT FLUX (Watts/m2) 2.28E 00	ROUGHNESS LENGTH (Meters) 1.608E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.252
MONIN-OBUKHOV LENGTH (Meters) -6.020E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.08E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.297E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.154E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.36E 02			BAR. PRES. AT WT LEVEL (Millibar) 1016.99
	BOWEN RATIO (no units) 0.112			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
98%	105%	71%	141%	79%	5%	27%	220%	36%	105%	43%	56%	71%
251%	251%	46%	48%	179%	5%	8%	227%	23%	71%	202%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050700  
 START TIME: 7:11:20 PST  
 START DATE: 5 May 1979 (DAY 125)

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD RICHARDSON NUMBER (+Stable, -Unstable) 0.000 [0.001] AT GMH	MOMENTUM FLUX (Nt/m2) -2.41E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.338E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.96E-05 [8.0E-06]	SCALING SPEC HUMID. (Kg/Kg) 5.878E-05 [3.0E-05]
Z/L AT GMH 0.000 [0.001]	LAT. HEAT FLUX (Watts/m2) 7.31E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 9.95E-03 [2.0E-02]
Z/L AT 10 METERS 0.000 [0.001]	SEN. HEAT FLUX (Watts/m2) -5.05E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.649E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 4.762E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.08E 02 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.297E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.32E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.000 [0.001]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
64%	64%	42%	25%	189%	0%	3%	138%	21%	0%	94%	65%	44%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905050730  
START TIME: 7:41:30 PST  
END TIME: 8:11:30 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 101 CHANNELS, 1 MIN  
DATA AVERAGING PERIOD: 40 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY CAP	WIND DIR
6.205	0.000	0.001	5.147	5.144	5.035	4.970	5.011	5.941	5.015
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
HULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	WIND DIR. B		
3.628	3.859	2.515	0.001	0.001	0.001	0.001	5.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPEMENT DATA, FIELD CALIBRATION AND WIND FIELD ESCAPEMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	OPTICAL	DIFF. CAL	WIND FIELD	WIND	WIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.127906	1421.128551	0.206	0.0	-0.009	0.000	0.000	0.001	0.002

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RANGE	VOL. REF. DEV.	VOL. REF. DEV.	ZERO REF. DEV.	AC VOL. FLUX	AC TEMP. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.1	5.000

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY CAP	HULK WT. TEMP.	AC TEMP. FLUX
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/273)	(Degree)	(Millibar)	(Watts/m2)	(Celsius)	(Watts/m2)
12.791	19.07	10.42	NO DATA	332.9	1015.99	5.59E-03	14.206	1.05E-03
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE GAGE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/273)	(Center MSL)	(Millibar)			
12.855	9.14	10.34	NO DATA	-0.16	1016.10			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REL. HUMID. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Percent)
10.35	12.971	14.144	14.304	9.529E-03	85.46	7.78E-03	10.641	14.701	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REL. HUMID. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Percent)
9.20	12.945	14.201	14.292	9.530E-03	84.67	7.74E-03	10.584	14.670	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905050730  
START TIME: 7:41:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 101 CHANNELS, 1 MIN  
DATA AVERAGING PERIOD: 40 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1975)

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILES
GRAD. RICHARDSON NUMBER	MOMENTUM FLUX	FRICTION VELOCITY	GENERAL FLUX DN (Z)	GENERAL FLUX DN (Z)
(+stable, -unstable)	(Nt/m2)	(cm/sec)	DN (Z) = 1015.99	DN (Z) = 1015.99
0.007 AT 0.01	3.13E-01	5.04E-01	0.2122E-01	0.2122E-01
GEOMETRIC MEAN HEIGHT	HUMIDITY FLUX	SCALING SPEC. HUMID.	WIND SPEED (K/M/SEC)	WIND SPEED (K/M/SEC)
(Meter) GHE = (Z1+Z2)/2	(Kg/sec m2)	(Kg/Kg)	2.6 (M/SEC)	2.6 (M/SEC)
12.99	3.59E-05	-5.704E-04	1.95E-01	1.95E-01
Z/L AT 0.01	LAT. HEAT FLUX	SCALING POT. TEMP.	W. SPEC. HUMIDITY (Kg/Kg)	W. SPEC. HUMIDITY (Kg/Kg)
0.013	(Watts/m2)	(Kelvin)	2.6 (M/SEC)	2.6 (M/SEC)
Z/L AT 10 METERS	SUN HEAT FLUX	ROUGHNESS LENGTH	DN (Z) = 8.92E-02	DN (Z) = 8.92E-02
0.019	(Watts/m2)	(Meters)	0.000	0.000
Z/L AT Z1	SKY AND SOLAR HEAT FLUX	DRAG COEFF. AT 10 METERS	W. POT. TEMP. (Kelvin)	W. POT. TEMP. (Kelvin)
0.013	(Watts/m2)	(Dimensionless)	2.6 (M/SEC)	2.6 (M/SEC)
Z/L AT Z2	TOTAL HEAT FLUX		DN (Z) = 2.64E-01	DN (Z) = 2.64E-01
0.009	(Watts/m2)		0.000	0.000
ROUNDED GEOMETRIC LENGTH	DOWN RATIO			
(Meters)	(No. units)			
1.015E-03	-0.130			
PS11 AT Z1 = 0.004952				
PS11 AT Z2 = 0.042584				
PS12 AT Z1 = 0.114779				
PS12 AT Z2 = 0.052546				

## \* GENERAL CONSTANTS

SUN CONSTANT	GRAVITATION	PROFILE	PROFILE	ROUN	ROUN
(No. units)	(M/sec2)	NUMBER	NUMBER	TRANS. COEF	TRANS. COEF
0.4	9.79E-09	0.74	0.74	0.92E-03	1.51E-03

## \* MISCELLANEOUS

## \* GENERAL NOTES

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of

DN1 DN2 = 0.01 Kg/Kg

AIR SPECIFIC HEAT  
(J/Kg/K)

WATER LAT. HEAT CAP  
(J/Kg/K)

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905050730  
 START TIME: 7:41:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
12.847	9.25	10.35	NO DATA	1016.09	13.280	-0.433	-0.335	0.915	1.013

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	% VAP. PRES. (Millibars)	REF. INDEX (Kel.xm 2/3)
10.00	12.945	14.194	14.292	9.544E-03	84.76	7.747E-03	12.597	14.861	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.020 AT GMM	MOMENTUM FLUX (Nt/m2) -1.31E-01	FRICTION VELOCITY (Meters/sec) 3.259E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.062E-01	AIR DENSITY (Kg/m3) 1.2319
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.49E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.190E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.485E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -0.025	LAT. HEAT FLUX (Watts/m2) 6.14E 01	SCALING POT. TEMP. (Kelvin) -1.487E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 4.840E-03	WATER LAT. HEAT VAP (Jcal./Kg) 5.9005E 02
Z/L AT 10 METERS -0.019	SEN. HEAT FLUX (Watts/m2) 6.04E 00	ROUGHNESS LENGTH (Meters) 1.095E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.306
MONIN-OBUKHOV LENGTH (Meters) -5.212E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.57E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.241E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.158E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.90E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.29
	BOWEN RATIO (no units) 0.098			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE FRROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
90%	90%	69%	140%	71%	5%	19%	210%	34%	105%	37%	54%	69%
279%	279%	46%	48%	207%	5%	7%	255%	23%	71%	230%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050730  
 START TIME: 7:41:30 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.002 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -2.04E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.976E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.027E-05 [3.0E-05]
Z/L AT GMM -0.03 [0.02]	LAT. HEAT FLUX (Watts/m2) 6.84E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 1.303E-02 [2.0E-02]
Z/L AT 10 METERS 0.002 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.08E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.797E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 4.307E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 5.57E 02 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.241E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.87E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.027 [0.01]	

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE MEASUREMENTS OR THE CORRESPONDING MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE APPROXIMATE AND ARE "+or-":

MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEFF.
4.1%	20%	139%	0%	1%	144%	23%	3%	103%	70%	41%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 2905050800  
START TIME: 08:11:40 PST  
END TIME: 08:41:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.001	5.148	5.141	4.496	4.317	5.024	4.707	5.304

No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
0.029	2.515	0.001	0.001	0.001	0.001	6.205

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

UPWIND NEAR	UPWIND LAND	DP2FCAL	WTRFCAL	WSIEC	WS2EC
10.141/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
9.199	91	-0.009	0.000	0.000	0.992

## \* ESCARPMENT CORRECTION PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

DATA BACK	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
180	0	0	0	0	0	115.2	59.82

## \* ESCARPMENT CORRECTION PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Deg. True)	(Millibar)	(Watt/m2)	(Kelvin)	(Kelvin)
325.3	1015.29	-6.56E-02	13.319	286.054

WIND DIR.	BAR. PRES. 2	TIDE TABLE
(Deg. True)	(Millibar)	(Meter MSL)
325.3	1016.39	-0.26

## \* ADJUSTED MICROMETEOROLOGICAL PARAMETERS:

POT. TEMP. 1	POT. TEMP. 2	VIR. TEMP. 1	VIR. TEMP. 2	V. POT. TEMP. 1	V. POT. TEMP. 2	ARS. HUMID. 1	ARS. HUMID. 2	REL. HUMID. 1	REL. HUMID. 2	SPEC. HUMID. 1	SPEC. HUMID. 2	VAP. PRES. 1	VAP. PRES. 2	S. VAP. PRES. 1	S. VAP. PRES. 2	REF. INDEX 1	REF. INDEX 2
(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Kg/m3)	(Percent)	(Percent)	(Kg/Kg)	(Kg/Kg)	(Millibar)	(Millibar)	(Millibar)	(Millibar)	(Kelvin)	(Kelvin)
13.035	13.022	14.210	14.276	14.390	14.366	9.581E-03	9.524E-03	85.11	84.13	7.784E-03	7.731E-03	12.647	12.575	14.859	14.948	NO DATA	NO DATA

## \* CONTINUOUS BELOW

RUN NUMBER: 2905050800  
START TIME: 08:11:40 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (1=UP, 2=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (1=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (Stable, Unstable) 0.013 AT GMM	MOMENTUM FLUX (Nt/m2) -1.27E-01	FRICTION VELOCITY (Meters/sec) 3.214E-01	GENERAL FORM: DN/DZ = [(N1-N2)/1/Ln(Z1/Z2)] (Z1=Z2) 1/2	GENERAL FORM: N SLOPE = [(1/N21-PS1)-(1/N22-PS1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meters) GMM/(Z1+Z2)/1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.22E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.613E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.72E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.24E-08
Z/L AT GMM 0.014	LAT. HEAT FLUX (Watts/m2) 5.49E-01	SCALING POT. TEMP. (Kelvin) 1.045E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -9.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -9.61E-03
Z/L AT Z1 0.022	SEN. HEAT FLUX (Watts/m2) -4.19E-06	ROUGHNESS LENGTH (Meters) 1.033E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.66E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 5.17E-01
Z/L AT Z2 0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.56E-02	DRAW CORF. AT 10 METERS (Dimensionless) 1.201E-03		N=LTEMP. STRUCT. (Km-2/3) Z=HEIGHT (M) Vert. Axis PS1=NOME CT2 SLOPE=NO DATA
MINOR TURBULENCE LENGTH (Meters) 7.066E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.06E-02			
PS11 AT Z1 0.18722	BOWEN RATIO (no units) -0.076			
PS11 AT Z2 0.059560				
PS12 AT Z1 0.160546				
PS12 AT Z2 0.461487				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units) 0.4	GRAVITATION ACCELERATION (M/sec2) 9.7959	PROFILE THIN. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Interpolation executed by insertion of:

WIND SPEED AT 10 M: 3.00 Kg/Kg

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2315

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.416E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9002E-03



RUN NUMBER: 7905050800  
 START TIME: 8:11:40 P.M.  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.922	8.13	10.33	NO DATA	1016.29	13.319	-0.397	-0.299	0.949	1.047

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.020	14.268	14.366	9.532E-03	84.24	7.738E-03	12.584	14.938	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.028 AT GMM	MOMENTUM FLUX (Nt/m2) -9.50E-02	FRICTION VELOCITY (Meters/sec) 2.777E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.712E-02	AIR DENSITY (Kg/m3) 1.2318
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.59	HUMIDITY FLUX (Kg/sec m2) 2.23E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.518E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.230E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMM -0.03	LAT. HEAT FLUX (Watts/m2) 5.51E 01	SCALING POT. TEMP. (Kelvin) -1.525E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 4.236E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9001E 05
Z/L AT 10 METERS -0.027	SEN. HEAT FLUX (Watts/m2) 5.28E 00	ROUGHNESS LENGTH (Meters) 6.032E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.348
MONIN-OBUKHOV LENGTH (Meters) -5.691E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.56E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.167E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.161E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.96E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.49
	BOWEN RATIO (no units) 0.096			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
131%	148%	94%	155%	109%	5%	13%	264%	47%	108%	62%	67%	94%
297%	297%	46%	47%	225%	5%	6%	273%	23%	70%	248%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905070800  
 START TIME: 8:11:40 P.M.  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.000 (0.001 AT GMM)	MOMENTUM FLUX (Nt/m2) -1.06E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.921E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.59	HUMIDITY FLUX (Kg/sec m2) 2.23E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.161E-05 (3.0E-05)
Z/L AT GMM 0.000 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.50E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 5.135E-03 (2.0E-02)
Z/L AT 10 METERS 0.000 (0.02)	SEN. HEAT FLUX (Watts/m2) -1.11E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 7.714E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 4.995E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.56E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.370E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.96E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.008 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
109%	108%	16%	0%	167%	0%	1%	108%	8%	8%	75%	29%	22%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050830  
START TIME: 8:41:50 PST  
END TIME: 9:11:50 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.127	5.121	4.317	4.160	5.035	5.310	5.110

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.706	3.815	2.514	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WTF2CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)
1411 130294	1421 131108	0.183	134	-0.009	0.000	0.000	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel. xM-2/3)
13.029	8.32	10.30	NO DATA	318.8	1015.45	-7.41E 02	13.355	286.230

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter ASL)	(Millibar)
13.111	7.80	10.20	NO DATA	-0.35	1016.55

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	13.209	14.373	14.553	9.501E-03	83.49	7.722E-03	12.548	15.030	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	13.201	14.446	14.536	9.447E-03	82.50	7.672E-03	12.480	15.127	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050830  
START TIME: 8:41:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUBINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD RICHARDSON NUMBER (+Stable, -Unstable) 0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -9.93F-02	FRICTION VELOCITY (Meter/sec) 2.841E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1+Z2)/1/2]	GENERAL FORM: N SLOPE = 1/(Ln(Z1-PSI1)-(Ln(Z2-PSI1))/ [N1-N2])
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.02E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.775E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.81E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.41E 00
Z/L AT GMM 0.013	LAT. HEAT FLUX (Watts/m2) 4.99E 01	SCALING POT. TEMP. (Kelvin) 5.960E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.36E 03
Z/L AT 10 METERS 0.010	SEN. HEAT FLUX (Watts/m2) -2.11E 00	ROUGHNESS LENGTH (Meters) 6.567E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 9.20E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 9.07E 01
Z/L AT Z1 0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.41E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.45E-03		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.009	TOTAL HEAT RUDGF1 FLUX (Watts/m2) -6.93E 02			
MONIN-BRUKHOV LENGTH (Meters) 9.948E 02				
PSI1 AT Z1 = -0.086698 PSI1 AT Z2 = -0.043467 PSI2 AT Z1 = -0.117160 PSI2 AT Z2 = -0.058740	BOWEN RATIO (no units) -0.042			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2310

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4166E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8992E 03

RUN NUMBER: 7905050830  
 START TIME: 8:41:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel x M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.101	7.86	10.21	NO DATA	1016.45	13.355	-0.254	-0.156	1.082	1.180

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel x M-2/3)
10.00	13.199	14.437	14.535	9.453E-03	82.62	7.678E-03	12.489	15.116	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.023 AT GMH	MOMENTUM FLUX (Nt/m2) -8.74E-02	FRICTION VELOCITY (Meters/sec) 2.664E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.095E-02	AIR DENSITY (Kg/m3) 1.2313
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.26E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.986E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.265E-05	AIR SPECIFIC HEAT (J/Kcal/Kg Kel.) 2.416E 02
Z/L AT GMH -0.029	LAT. HEAT FLUX (Watts/m2) 5.59E 01	SCALING POT. TEMP. (Kelvin) -1.175E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.130E-03	WATER LAT. HEAT VAP. (J/Kcal/Kg) 5.8990E 05
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 3.90E 00	ROUGHNESS LENGTH (Meters) 5.148E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.387
MONIN-OBUKHOV LENGTH (Meters) -4.411E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.41E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.149E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.164E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.81E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.6%
	BOWEN RATIO (no units) 0.070			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
183%	201%	108%	165%	162%	5%	11%	326%	54%	111%	108%	74%	108%
450%	450%	46%	46%	378%	5%	6%	424%	23%	69%	401%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050830  
 START TIME: 8:41:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.000 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -9.09E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.716E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.21E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.470E-05 [3.0E-05]
Z/L AT GMH -0.000 [0.02]	LAT. HEAT FLUX (Watts/m2) 5.46E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 2.214E-03 [2.0E-02]
Z/L AT 10 METERS -0.000 [0.02]	SEN. HEAT FLUX (Watts/m2) -3.10E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.670E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.919E 05	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.41E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.250E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.85E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.066 [0.081]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
88%	88%	7%	6%	108%	0%	1%	71%	4%	9%	51%	12%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905050900  
START TIME: 9:12: 0 PST  
END TIME: 9:42: 0 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOL):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
5.205	0.001	0.001	5.118	5.114	4.484	4.323	5.035	5.867	4.932
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQ	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.734	3.802	2.517	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff)	(Coeff)
1411.132238	1421.133031	0.1M3	140	-0.009	0.000	0.500	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA WAGE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.2	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
13.224	8.64	10.24	NO DATA	312.7	1015.45	-8.10E-02	13.363	286.424
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter KSL)	(Millibar)			
13.303	8.10	10.16	NO DATA	-0.44	1016.55			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
14.35	13.404	14.563	14.743	9.459E-03	82.13	7.695E-03	12.507	15.222	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	13.397	14.637	14.725	9.411E-03	81.23	7.649E-03	12.442	15.318	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050900  
START TIME: 9:12: 0 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHING, 1973)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPE (+ INCR WITH HEIGHT)
LEAD RICHARDSON NUMBER (+ Stable, - Unstable) 0.011 AT 6M	MOMENTUM FLUX (Nt/m2) -1.05E-01	FRICTION VELOCITY (Meters/sec) 0.905E-01	GENERAL FORM: DN/DZ (1/N1 N2)/(1/N1(Z1/Z2)+ (Z1/Z2)^(1/2))	GENERAL FORM: N SLOPE (1/N1 N2)/(1/N1(Z1/Z2)+ (Z1/Z2)^(1/2))
GEOMETRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 2.05E-05	SCALING SPEC. HUMID. (kg/kg) -5.697E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 6.04E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1-PS11 MS SLOPE= 1.37E-01
Z/L AT 6M 0.012	LAT. HEAT FLUX (Watts/m2) 5.04E-01	SCALING POT. TEMP. (Kelvin) 7.435E-03	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert Axis PS1-PS12 SH SLOPE= 9.49E-03
Z/L AT 10 METERS 0.012	SEN. HEAT FLUX (Watts/m2) 2.71E-00	ROUGHNESS LENGTH (Meters) 7.319E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.16E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1-PS12 PTK SLOPE= 2.24E-01
Z/L AT Z1 0.012	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.18E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.47E-03		N=TEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert Axis PS1-NONE CT2 SLOPE=NO DATA
MOHIN-BRUKHOV LENGTH (Meters) 8.461E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.70E-02			
PS11 AT Z1= -0.101956 PS11 AT Z2= -0.051107 PS12 AT Z1= 0.127251 PS12 AT Z2= 0.064963	ROMAN RATIO (no units) -0.053			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec. 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m3)  
1.2302

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4166E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.8981E-05

RUN NUMBER: 7905050900  
 START TIME: 9:12: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.293	8.16	10.17	NO DATA	1016.46	13.383	-0.090	0.008	1.243	1.341

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.391	14.626	14.724	9.417E-03	81.33	7.653E-03	12.450	15.307	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.012 AT 6MH	MOMENTUM FLUX (Nt/m2) -9.58E-02	FRICTION VELOCITY (Meters/sec) 2.790E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.783E-02	AIR DENSITY (Kg/m3) 1.2385
GEOMETRIC MEAN HEIGHT (Meter) 6MH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.41E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.027E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.412E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT 6MH 0.016	LAT. HEAT FLUX (Watts/m2) 5.96E 01	SCALING POT. TEMP. (Kelvin) -6.946E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 1.938E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8980E 05
Z/L AT 10 METERS 0.012	SEN. HEAT FLUX (Watts/m2) 2.41E 00	ROUGHNESS LENGTH (Meters) 6.137E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.415
MOHIN BROUKHOV LENGTH (Meters) 0.191E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.18E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.169E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.56E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.66
	BOWEN RATIO (no units) 0.040			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
14%	19%	10%	16%	13%	5%	11%	30%	5%	110%	8%	7%	10%
14%	19%	4%	4%	87%	5%	18%	61%	2%	6%	610%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050900  
 START TIME: 9:12: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( )

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 TO -0.013 AT 6MH	MOMENTUM FLUX (Nt/m2) -9.86E 01 (1.6 0E 02)	FRICTION VELOCITY (Meters/sec) 2.831E 01 (1.6 0E 02)
GEOMETRIC MEAN HEIGHT (Meter) 6MH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.35E 05 (1.8 0E 06)	SCALING SPEC. HUMID. (Kg/Kg) 6.514E 05 (1.3 0E 05)
Z/L AT 6MH 0.014 TO 0.01	LAT. HEAT FLUX (Watts/m2) 5.76E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 7.234E 05 (2.0E+02)
Z/L AT 10 METERS 0.011 TO 0.01	SEN. HEAT FLUX (Watts/m2) -2.59E 00 (1.0E+00)	ROUGHNESS LENGTH (Meters) 6.525E 05 (6.0E+05)
MOHIN BROUKHOV LENGTH (Meters) 0.902E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 11.18E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.251E 03 (4.0E+04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.65E 02 (1.0E+01)	
	BOWEN RATIO (no units) -0.049 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
7%	11%	5%	9%	11%	0%	1%	7%	3%	10%	50%	9%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905050930  
START TIME: 9:42:10 PST  
END TIME: 10:12:10 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUCT. 1 0.001	No. 02 TEMP. STRUCT. 2 0.001	No. 03 DEW POINT 1 5.143	No. 04 DEW POINT 2 5.132	No. 05 WIND SPEED 1 4.070	No. 06 WIND SPEED 2 3.888	No. 07 BAR. PRES. 2 5.048	No. 08 SKY RAD. 6.348	No. 09 WIND DIR. 4.894
No. 10 BULK WT TEMP 3.778	No. 11 AC FREQUENCY 3.825	No. 12 AC VOLTAGE 2.514	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 133579	No. 2 AIR TEMP. 2 1421 134475	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH (Meters) 145	DP1FCAL (Volts) -0.009	DP2FCAL (Volts) 0.000	WTRFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	ZERO REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC FREQ. FLUX (No. scans) 0	AC VOLTAGE (VAC) 115.1	AC FREQUENCY (Hz) 49.82
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 13.358	WIND SPEED 1 (Meter/sec) 7.75	DEW POINT 1 (Celsius) 10.39	TEMP. STRUCT. 1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 311.4	BAR. PRES. 1 (Millibar) 1015.65	SKY RAD. (Watt/m2) -8.85E 02	BULK WT TEMP (Celsius) 13.426	MEAN AIR TEMP (Kelvin) 286.563
AIR TEMP. 2 (Celsius) 13.447	WIND SPEED 2 (Meter/sec) 7.30	DEW POINT 2 (Celsius) 10.27	TEMP. STRUCT. 2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.51	BAR. PRES. 2 (Millibar) 1016.75			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 13.538	VIR. TEMP. 1 (Celsius) 14.712	V. POT. TEMP. 1 (Celsius) 14.891	ABS. HUMID. 1 (Kg/m3) 9.551E-03	REL. HUMID. 1 (Percent) 82.22	SPEC. HUMID. 1 (Kg/Kg) 7.770E-03	VAP. PRES. 1 (Millibar) 12.629	S. VAP. PRES. 1 (Millibar) 15.359	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 13.538	VIR. TEMP. 2 (Celsius) 14.798	V. POT. TEMP. 2 (Celsius) 14.881	ABS. HUMID. 2 (Kg/m3) 9.480E-03	REL. HUMID. 2 (Percent) 81.07	SPEC. HUMID. 2 (Kg/Kg) 7.706E-03	VAP. PRES. 2 (Millibar) 12.519	S. VAP. PRES. 2 (Millibar) 15.466	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905050930  
START TIME: 9:42:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOG  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.012 AT 6M	MOMENTUM FLUX (Nt/m2) -7.12E-02	FRICTION VELOCITY (Meters/sec) 2.405E-01	GENERAL FORM DN/DZ (N1-N2)/(ln(Z1/Z2)+ (Z1+Z2)/2)	GENERAL FORM N SLOPE (ln Z1 - PS1)/(ln Z2 - PS1+1/2) (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.67E-05	SCALING SPEC. HUMID (Kg/Kg) 5.615E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = 5.01E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1-PS11 WS SLOPE = 1.66E 00
Z/L AT 6M 0.017	LAT. HEAT FLUX (Watts/m2) 4.11E 01	SCALING POT. TEMP. (Kelvin) 5.635E-03	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1-PS12 SH SLOPE = 9.50E 03
Z/L AT 10 METERS 0.013	SUN HEAT FLUX (Watts/m2) -1.69E 00	ROUGHNESS LENGTH (Meters) 3.449E-05	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = 8.92E 03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1-PS12 PK SLOPE = 9.50E 01
Z/L AT Z1 0.014	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.85E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.22E-03		N-TEMP. STRUCT. (K-M 2/3) Z-HEIGHT (M) Vert Axis PS1=NONE CT SLOPE=NO DATA
Z/L AT Z2 0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.46E 02			
MININ-BRUKHOV LENGTH (Meters) 7.55E 02	BOWEN RATIO (no units) -0.041			
PS11 AT Z1 = -0.114155 PS11 AT Z2 = -0.057233 PS12 AT Z1 = -0.154263 PS12 AT Z2 = -0.077342				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2297

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-03 Kg/Kg.  
PTK1-PTK2 = +/- .008 K/M.

AIR SPECIFIC HEAT  
(J/Kcal./Kg Kel.)  
2.4167E 02  
WATER LAT. HEAT VAP.  
(J/Kcal./Kg)  
5.8973E 05

RUN NUMBER: 7905050930  
 START TIME: 9:42:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U.POT-WT TEMP (Kelvin)
13.437	7.35	10.28	NO DATA	1016.65	13.426	0.011	0.109	1.355	1.453

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.535	14.781	14.879	9.487E-03	81.21	7.714E-03	12.550	15.454	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.012 AT 10M	MOMENTUM FLUX (Nt/m2) -7.42E-02	FRICTION VELOCITY (Meters/sec) 2.455E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.029E-02	AIR DENSITY (Kg/m3) 1.2301
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.14E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.072E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.136E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT 10M -0.015	LAT. HEAT FLUX (Watts/m2) 5.27E 01	SCALING POT. TEMP. (Kelvin) -5.140E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 1.262E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8971E 05
Z/L AT 10 METERS -0.012	SEN. HEAT FLUX (Watts/m2) 1.57E 00	ROUGHNESS LENGTH (Meters) 3.746E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.461
MONIN-OBUKHOV LENGTH (Meters) -8.579E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.85E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.115E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.31E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.85
	BOWEN RATIO (no units) 0.030			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
194%	217%	117%	170%	170%	5%	9%	341%	59%	112%	112%	79%	117%
588%	588%	46%	46%	516%	5%	6%	563%	23%	69%	539%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905050930  
 START TIME: 9:42:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARETHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -7.33E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.441E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.04E-05 (9.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.52E-05 (3.0E-05)
Z/L AT 10M 0.008 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.03E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 3.786E-03 (2.0E-02)
Z/L AT 10 METERS 0.007 (0.02)	SEN. HEAT FLUX (Watts/m2) 8.78E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.641E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.532E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.85E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Dimensionless) 1.144E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.37E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.014 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
66%	69%	2%	13%	61%	0%	1%	46%	1%	11%	32%	3%	5%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905051000  
START TIME: 10:12:30 PST  
END TIME: 10:42:30 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.SI-UC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.119	5.107	4.389	4.209	5.043	6.683	4.891

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.618	3.876	2.512	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WSTEC	WSTEC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.155200	1421.155984	0.183	149	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA PAGE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	R(No.).005V	(No.).002V	(No.).35V	(No.).1Hz	(VAC)	(Hz)
0	0	0	0	0	0	0	0	115.1	59.88

## \* ESCARPMENT AND ESCARPMENT CORRECTIONS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.529	8.46	10.25	NO DATA	311.3	1015.58	-9.32E 02	13.465	286.719

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.596	7.87	10.12	NO DATA	-0.57	1016.68

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

REL.HUMID.1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.766	14.861	15.041	9.454E-03	80.58	7.696E-03	12.507	15.521	NO DATA

REL.HUMID.2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.24	13.689	14.928	15.018	9.377E-03	79.46	7.627E-03	12.410	15.618	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051000  
START TIME: 10:12:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
UNADJUSTED WIND NUMBER (+Stable, -Unstable) 0.011 AT 0M	MOMENTUM FLUX (Nt/m2) 1.17E-01	FRICTION VELOCITY (Meters/sec) 3.083E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2)) (Z1/Z2)^(1/2)]	GENERAL FORM: N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN WIND (Meters) (Ln(Z1/Z2)^(1/2)) 12.29	HUMIDITY FLUX (kg/sec m2) 2.16E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.709E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 6.36E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 SH SLOPE= 1.30E 00
Z/L AT 0M 0.015	LAT. HEAT FLUX (Watts/m2) 5.34E 01	SCALING POT. TEMP. (Kelvin) 8.68E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.47E 03
Z/L AT 10 METERS 0.017	SEN. HEAT FLUX (Watts/m2) -3.09E 00	ROUGHNESS LENGTH (Meters) 8.885E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.26E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 6.70E 01
Z/L AT Z1 0.021	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.32E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.66E-03		N=LnTEMP.STRUC (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.011	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.82E 02			
MOMENTUM DRAG LENGTH (Meters) 8.674E 02				
PSI1 AT Z1= -0.099425 PSI1 AT Z2= -0.049848 PSI2 AT Z1= -0.134559 PSI2 AT Z2= -0.067362	HOWEN RATIO (no units) -0.058			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2290

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8965E 05

\* GENERAL NOTES:  
Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905051000  
 START TIME: 10:12:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.589	7.95	10.13	NO DATA	1016.58	13.465	0.124	0.222	1.455	1.553

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.90	13.687	14.928	15.018	9.387E-03	79.60	7.635E-03	12.422	15.607	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.003 AT GMH	MOMENTUM FLUX (Nt/m2) -8.98E-02	FRICTION VELOCITY (Meters/sec) 2.703E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.308E-02	AIR DENSITY (Kg/m3) 1.2294
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.45E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.362E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.447E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT GMH -0.003	LAT. HEAT FLUX (Watts/m2) 6.04E 01	SCALING POT. TEMP. (Kelvin) -1.381E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 3.732E-04	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8963E 05
Z/L AT 10 METERS -0.003	SEN. HEAT FLUX (Watts/m2) 4.64E-01	ROUGHNESS LENGTH (Meters) 5.448E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.499
MONIN-OBUKHOV LENGTH (Meters) -3.874E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.32E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.155E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.71E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.78
	BOWEN RATIO (no units) 0.008			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
151%	167%	98%	158%	129%	5%	10%	287%	49%	109%	80%	69%	98%
355%	355%	46%	45%	283%	5%	6%	328%	23%	68%	306%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051000  
 START TIME: 10:12:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -9.85E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.825E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (kg/sec m2) 2.30E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 6.724E-05 (3.0E-05)
Z/L AT GMH 0.009 (0.02)	LAT. HEAT FLUX (Watts/m2) 5.88E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 6.114E-03 (2.0E-02)
Z/L AT 10 METERS 0.007 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.98E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.767E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.426E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.32E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.50E-05 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.71E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.027 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
35%	37%	15%	7%	63%	0%	1%	41%	7%	13%	27%	26%	21%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051030  
START TIME: 10:42:40 PST  
END TIME: 11:12:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.130	5.111	4.716	4.540	5.044	6.980	4.912
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.829	3.877	2.511	0.001	0.001	0.001	0.001	0.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DPIFCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 136359	1421 137189	0.183	151	-0.009	0.000	0.000	0.992	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(V)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.636	9.08	10.31	NO DATA	312.0	1015.59	-9.62E-02	13.475	286.837
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
13.719	8.49	10.14	NO DATA	-0.60	1016.69			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S.VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.816	14.984	15.163	9.490E-03	80.31	7.728E-03	12.560	15.639	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S.VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.29	13.809	15.051	15.142	9.389E-03	78.97	7.640E-03	12.430	15.741	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051030  
START TIME: 10:42:40 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRISINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 AT GMM	MOMENTUM FLUX (Nt/m2) -1.30E-01	FRICTION VELOCITY (Meters/sec) 3.256E-01	GENERAL FORM: $DN/DZ = [ (N1-N2) / (Ln(Z1/Z2))^2 ]$	GENERAL FORM: $N'SLOPE = [ (LnZ1-PS1) - (LnZ2-PS1) ] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meters) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -2.61E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.524E-05	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) $DSH/DZ = 6.56E-02$	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.23E-00
Z/L AT GMM 0.010	LAT. HEAT FLUX (Watts/m2) -6.44E-01	SCALING POT. TEMP. (Kelvin) 5.889E-03	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) $DSH/DZ = 9.08E-06$	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 8.29E-03
Z/L AT 10 METERS 0.008	SFN. HEAT FLUX (Watts/m2) -2.38E-00	ROUGHNESS LENGTH (Meters) 1.082E-04	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) $DPT/DZ = 8.92E-04$	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 9.11E-01
Z/L AT Z1 0.014	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.62E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.57E-03		N=LnTEMP.STRUC. (Km-2/3) Z= HEIGHT (M) Vert. Axis PS1=NONE CTD SLOPE=NO DATA
Z/L AT Z2 0.007	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.03E-03			
MONIN-OBUKHOV LENGTH (Meters) 1.325E-03	BOWEN RATIO (no units) 0.037			
PS11 AT Z1 = -0.065080 PS11 AT Z2 = -0.032626 PS12 AT Z1 = -0.087945 PS12 AT Z2 = -0.044092				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

PTK1-PTK2 = +/- .008 K/L.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2285

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4166E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8958E-05

RUN NUMBER: 7905051030  
 START TIME: 10:42:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kel./m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.709	8.56	10.16	NO DATA	1016.59	13.475	0.234	0.332	1.568	1.666

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel./m-2/3)
10.00	13.807	15.043	15.141	9.401E-03	79.13	7.650E-03	12.446	15.729	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.003 AT 10M	MOMENTUM FLUX (Nt/m2) -1.00E-01	FRICTION VELOCITY (Meters/sec) 2.961E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.768E-02	AIR DENSITY (Kg/m3) 1.2289
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.63E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.219E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.627E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4165E 02
Z/L AT 10M 0.004	LAT. HEAT FLUX (Watts/m2) 6.48E 01	SCALING POT. TEMP. (Kelvin) 2.072E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -6.134E-04	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8956E 05
Z/L AT 10 METERS 0.003	SEN. HEAT FLUX (Watts/m2) -7.63E-01	ROUGHNESS LENGTH (Meters) 7.661E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.510
MONIN-OBUKHOV LENGTH (Meters) 3.098E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.62E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.195E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.98E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.74
	BOWEN RATIO (no units) -0.012			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
184%	197%	104%	153%	162%	5%	11%	315%	52%	101%	110%	72%	104%
272%	281%	46%	45%	209%	5%	6%	254%	23%	68%	232%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051030  
 START TIME: 10:42:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.005 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -1.15E 01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.051E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.43E-05 (9.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 1.665E 05 (3.0E 05)
Z/L AT 10M 0.007 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.53E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 4.650E-03 (2.0E 02)
Z/L AT 10 METERS 0.006 (0.02)	SEN. HEAT FLUX (Watts/m2) -1.67E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 8.841E-05 (6.0E 05)
MONIN-OBUKHOV LENGTH (Meters) 1.734E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.62E 02 (2.0E+01)	DRAW COEFF. AT 10 METERS (Dimensionless) 1.30E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.41E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.010 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
10%	11%	11%	20%	27%	0%	7%	31%	5%	23%	10%	14%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905051100  
START TIME: 11:12:50 PST  
END TIME: 11:42:50 PST  
START DATE: 5 May 1979 (DAY 175)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DW. POINT 1	DW. POINT 2	WIND. SPEED 1	WIND. SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.163	5.157	4.743	4.524	5.037	7.032	4.906
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SHAKE A	SHAKE B	VOLT. REF. B		
5.690	3.837	2.510	0.001	0.991	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRELATIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	UPWIND	UPWIND	UPWIND	UPWIND	UPWIND	UPWIND
WIND. TEMP. 1	WIND. TEMP. 2	HEIGHT/LENGTH	PATH/LENGTH	HEIGHT	HEIGHT	HEIGHT	HEIGHT	HEIGHT	HEIGHT
1411.136639	1421.137909	0.183	100	0.009	0.000	0.000	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

PARAMETER	FLAG	ERRON. COUNT	DATA CASE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scales)		(No. scales)		(No. 25V)	(No. 25V)	(No. 25V)	(No. 25V)	(No. 25V)	(No. 25V)	(No. 25V)
3		8	180	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND. TEMP. 1	WIND. SPEED 01	DW. POINT 1	TEMP. STRUCT. 1	WIND. DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.648	9.13	10.51	NO DATA	311.8	1015.49	-9.81E-02	13.537	266.867
WIND. TEMP. 2	WIND. SPEED 02	DW. POINT 2	TEMP. STRUCT. 2	TIME TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Meter MSL)	(Millibar)			
13.791	8.46	10.31	NO DATA	-9.61	1016.59			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
10.35	13.848	15.034	15.214	9.614E-03	81.22	7.832E-03	12.707	15.670	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
9.29	13.881	15.159	15.229	9.492E-03	79.49	7.722E-03	12.570	15.813	NO DATA

## \* CONTINUE BELOW

RUN NUMBER: 2905051100  
START TIME: 11:12:50 PST  
START DATE: 5 May 1979 (DAY 175)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (GROSSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.023 AT 0M	MOMENTUM FLUX (Nt/m2) 2.21E-01	FRICTION VELOCITY (Meters/sec) 4.245E-01	GENERAL FORM: $DN/DZ = (N1-N2)/[Ln(Z1/Z2)]$	GENERAL FORM: $N$ SLOPE: $[Ln(Z1/Z2)] / [Ln(Z2/Z1)]$
GEOMETRIC MEAN HEIGHT (Meters) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 4.54E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.704E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) $DN/DZ = 7.46E-07$	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis $PSI=PSI1$ WS SLOPE = 9.47E-01
Z/L AT 0M 0.029	LAT. HEAT FLUX (Watts/m2) -1.17E-02	SCALING POT. TEMP. (Kelvin) -2.750E-07	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) $DSH/DZ = 1.17E-05$	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis $PSI=PSI2$ SH SLOPE = 6.21E-01
Z/L AT 10 METERS -0.022	SEN. HEAT FLUX (Watts/m2) 1.45E-01	ROUGHNESS LENGTH (Meters) 2.253E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) $[PT/DZ] = -3.70E-03$	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis $PSI=PSI2$ PTR SLOPE = -1.97E-01
Z/L AT Z2 -0.020	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.81E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.64E-03		N-LATENT HEAT (KJ/m2 s) Z-HEIGHT (M) Vert. Axis $PSI=PSI2$ LTD SLOPE=NO DATA
MOISTENING LENGTH (Meters) 4.541E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.00E-03			
PSI1 AT Z1: 0.129234 PSI1 AT Z2: 0.069833 PSI2 AT Z1: 0.088542 PSI2 AT Z2: 0.047242	BOYLE RATIO (No. mol. g) 0.132			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) <th>GRAVITATION (M/sec2) <th>PROF. FRICTION NUMBER <th>PROF. FRICTION NUMBER <th>BULK SEN. HEAT TRANSFER COEF. <th>BULK MOISTURE TRANSFER COEF. </th></th></th></th></th>	GRAVITATION (M/sec2) <th>PROF. FRICTION NUMBER <th>PROF. FRICTION NUMBER <th>BULK SEN. HEAT TRANSFER COEF. <th>BULK MOISTURE TRANSFER COEF. </th></th></th></th>	PROF. FRICTION NUMBER <th>PROF. FRICTION NUMBER <th>BULK SEN. HEAT TRANSFER COEF. <th>BULK MOISTURE TRANSFER COEF. </th></th></th>	PROF. FRICTION NUMBER <th>BULK SEN. HEAT TRANSFER COEF. <th>BULK MOISTURE TRANSFER COEF. </th></th>	BULK SEN. HEAT TRANSFER COEF. <th>BULK MOISTURE TRANSFER COEF. </th>	BULK MOISTURE TRANSFER COEF.
0.4	9.7959	0.24	0.24	1.92E-03	1.35E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2281

AIR SPECIFIC HEAT  
(J/Kg K)  
1.013E-02

WATER LAT. HEAT CAP  
(J/Kg K)  
4.1868E-01

AD-A116 210

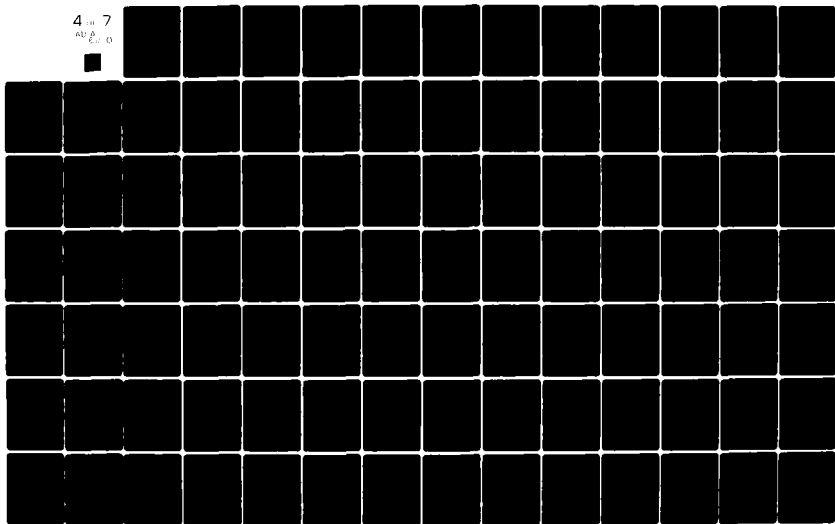
NAVAL RESEARCH LAB WASHINGTON DC  
THE DATA BASE FOR THE MAY 1979 MARINE SURFACE LAYER MICROMETEOR--ETC(U)  
MAY 82 T V BLANC  
NRL-MR-4713

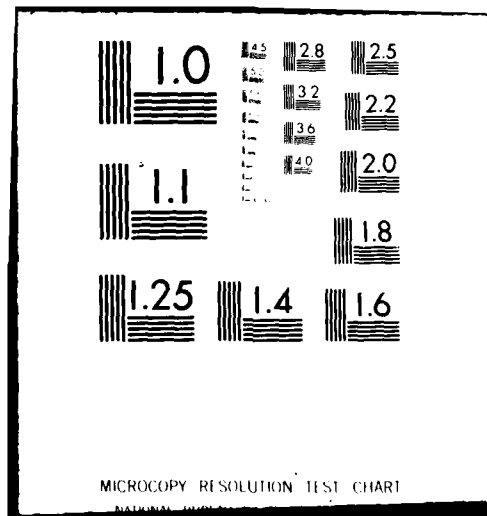
F/G 4/2

UNCLASSIFIED

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RUN NUMBER: 7905051100  
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 NRI. MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.776	8.54	10.33	NO DATA	1016.49	13.537	0.239	0.337	1.589	1.687

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	AKS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	13.974	15.126	15.224	9.507E-03	79.70	7.739E-03	12.589	15.796	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.003 AT 6MH	MOMENTUM FLUX (Nt/m2) -1.07E-01	FRICTION VELOCITY (Meters/sec) 2.952E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.717E-02	AIR DENSITY (Kg/m3) 1.2284
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.55E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.032E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.550E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT 6MH 0.004	LAT. HEAT FLUX (Watts/m2) 8.29E 01	SCALING POT. TEMP. (Kelvin) 2.202E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -6.501E-04	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8952E 05
Z/L AT 10 METERS 0.003	SEN. HEAT FLUX (Watts/m2) -8.08E-01	ROUGHNESS LENGTH (Meters) 7.579E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.571
MONIN-OBUKHOV LENGTH (Meters) 2.899E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.81E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.194E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.19E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.69
	BOWEN RATIO (no units) -0.013			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
98%	98%	85%	124%	72%	5%	13%	196%	42%	82%	30%	62%	85%
270%	278%	46%	46%	206%	5%	6%	252%	23%	69%	229%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051100  
 START TIME: 11:12:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRI. MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC OF RIVD PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.016 (0.02) AT 6MH	MOMENTUM FLUX (Nt/m2) -1.47E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.407E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.42E-06 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 1.567E-06 (3.0E-05)
Z/L AT 6MH -0.020 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.59E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.410E-02 (2.0E-02)
Z/L AT 10 METERS -0.015 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.05E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.572E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.492E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.81E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.659E-04 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.65E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.078 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
71%	71%	40%	40%	81%	0%	9%	73%	20%	263%	78%	65%	46%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051130  
START TIME: 11:43: 0 PST  
END TIME: 12:13:10 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.200	5.167	4.722	4.500	5.026	7.091	4.901

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.934	3.861	2.510	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 137025	1421 138143	0.183	151	-0.009	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.1	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.702	9.09	10.73	NO DATA	311.6	1015.31	-9.89E 02	13.578	286.918

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.814	8.42	10.48	NO DATA	-0.59	1016.40

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.882	15.089	15.268	9.752E-03	82.22	7.947E-03	12.911	15.703	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.904	15.178	15.268	9.597E-03	80.27	7.815E-03	12.710	15.634	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051130  
START TIME: 11:43: 0 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 AT GMM	MOMENTUM FLUX (Nt/m2) -2.13E-01	FRICTION VELOCITY (Meters/sec) 4.170E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$ (Z1*Z2)^(1/2)	GENERAL FORM: $N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -5.53E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.080E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.53E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI WS SLOPE = 9.59E-01
Z/L AT GMM -0.019	LAT. HEAT FLUX (Watts/m2) -1.34E 02	SCALING POT. TEMP. (Kelvin) -1.802E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.48E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 5.01E 03
Z/L AT Z1 -0.027	SFM. HEAT FLUX (Watts/m2) 9.34E 00	ROUGHNESS LENGTH (Meters) 2.587E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.47E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.00E 01
Z/L AT Z2 -0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.89E 02	DRAW COEF. AT 10 METERS (Dimensionless) 0.577E 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -6.815E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.12E 03			
PSI1 AT Z1 = 0.090299 PSI1 AT Z2 = 0.047707 PSI2 AT Z1 = 0.055716 PSI2 AT Z2 = 0.029075	ROMFN RATIO (no units) -0.048			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2277

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4170E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.8953E 06



RUN NUMBER: 7905051130  
 START TIME: 11:43: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.861	8.50	10.51	NO DATA	1016.31	13.578	0.223	0.321	1.589	1.687

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	13.899	15.167	15.265	9.616E-03	80.50	7.831E-03	12.735	15.819	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) 0.003 AT GHM	MOMENTUM FLUX (Nt/m2) -1.06E-01	FRICTION VELOCITY (Meters/sec) 2.934E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.606E-02	AIR DENSITY (Kg/m3) 1.2280
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.45E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.798E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.446E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GHM 0.004	LAT.HEAT FLUX (Watts/m2) 6.04E 01	SCALING POT.TEMP. (Kelvin) 1.735E-03	WITH POT.TEMPERATURE (Meter Kel./sec) -5.090E-04	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8951E 05
Z/L AT 10 METERS 0.003	SEN.HEAT FLUX (Watts/m2) -6.33E-01	ROUGHNESS LENGTH (Meters) 7.402E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.610
MONIN-OBUKHOV LENGTH (Meters) 3.632E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.89E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.191E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.29E 02			BAR.PRES.AT WT LEVEL (Millibar) 1017.51
	BOWEN RATIO (no units) -0.810			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
109%	109%	85%	109%	84%	5%	14%	193%	42%	66%	42%	62%	85%
279%	286%	46%	46%	214%	5%	5%	260%	23%	69%	237%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051130  
 START TIME: 11:43: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.010 (0.02) AT GHM	MOMENTUM FLUX (Nt/m2) -1.44E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.369E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.07E-07 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) 2.208E-05 (3.0E-05)
Z/L AT GHM -0.013 (0.02)	LAT.HEAT FLUX (Watts/m2) 1.50E 00 (2.0E+01)	SCALING POT.TEMP. (Kelvin) -1.504E-02 (2.0E-02)
Z/L AT 10 METERS -0.010 (0.02)	SEN.HEAT FLUX (Watts/m2) 6.52E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.495E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.013E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.89E 02 (2.0E+01)	DRAG COEF.AT 10 METERS (Meters) 1.636E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.82E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.044 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
47%	48%	39%	530%	83%	0%	10%	37%	19%	293%	60%	63%	45%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905051200  
START TIME: 12:13:20 PST  
END TIME: 12:43:30 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
8.205	0.001	0.001	5.218	5.181	4.763	4.580	5.014	7.090	4.798

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AL FREQ	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.963	3.903	2.510	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 137843	1421 138715	0.157	147	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.),005V	B(No.),005V	(No.),002V	(No.),5V	(No.),1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.1	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Millibar)	(Kelvin)
13.794	9.18	10.84	NO DATA	308.1	1015.13	-9.89E 02	13.607	286.988

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
13.771	8.63	10.56	NO DATA	-0.55	1016.22

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.964	15.181	15.361	9.817E-03	82.37	8.004E-03	13.001	15.784	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.962	15.243	15.333	9.646E-03	80.41	7.858E-03	12.778	15.890	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051200  
START TIME: 12:13:20 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.008 AT GHM	MOMENTUM FLUX (Nt/m2) -1.13E-01	FRICTION VELOCITY (Meters/sec) 3.032E-01	GENERAL FORM: DN/DZ = 1/(N1-N2) * (1/(Z1/Z2) * (Z1+Z2)/1/2)	GENERAL FORM: N SLOPE = 1/(LnZ1-PSI1) - (LnZ2-PSI1)/(N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -3.97E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.068E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 6.15E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.32E 00
Z/L AT GHM 0.01	LAT. HEAT FLUX (Watts/m2) -9.81E 01	SCALING POT. TEMP. (Kelvin) 5.840E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.63E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 5.86E 03
Z/L AT 10 METERS 0.009	SEN. HEAT FLUX (Watts/m2) -2.20E 00	ROUGHNESS LENGTH (Meters) 8.362E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 9.24E 01
Z/L AT Z1 0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.89E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.334E-03		
Z/L AT Z2 0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.09E 03			
MONIN-ORUKHOV LENGTH (Meters) 1.160E 03	BOWEN RATIO (no units) 0.022			N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1= -0.074333 PSI1 AT Z2= -0.037268 PSI2 AT Z1= -0.100450 PSI2 AT Z2= -0.050362				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

PTK1-PTK2= +/- .008 Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2271

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4171E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8949E 05

RUN NUMBER: 7905051200  
 START TIME: 12:13:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.861	8.78	10.59	NO DATA	1016.13	13.687	0.254	0.352	1.629	1.727

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.959	15.235	15.333	9.667E-03	80.65	7.875E-03	12.805	15.878	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.004 AT GMM	MOMENTUM FLUX (Nt/m2) -1.12E-01	FRICTION VELOCITY (Meters/sec) 3.017E-01	WITH LONG. VELOCITY (Meter2/sec2) -9.104E-02	AIR DENSITY (Kg/m3) 1.2275
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.47E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.656E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.465E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4170E 02
Z/L AT GMM 0.005	LAT. HEAT FLUX (Watts/m2) 6.08E 01	SCALING POT. TEMP. (Kelvin) 2.713E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -8.186E-04	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8948E 05
Z/L AT 10 METERS 0.004	SFN. HEAT FLUX (Watts/m2) -1.02E 00	ROUGHNESS LENGTH (Meters) 8.210E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.636
MONIN-OBUKHOV LENGTH (Meters) 2.458E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.89E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.204E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.29E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.33
	BOWEN RATIO (no units) -0.017			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
190%	286%	112%	122%	167%	5%	12%	289%	56%	66%	111%	76%	112%
262%	272%	46%	47%	200%	5%	5%	247%	23%	70%	223%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051200  
 START TIME: 12:13:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.006 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.12E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.022E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.80E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 2.275E-05 [3.0E-05]
Z/L AT GMM 0.009 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.68E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 4.801E-03 [2.0E-02]
Z/L AT 10 METERS 0.007 [0.02]	SFN. HEAT FLUX (Watts/m2) -1.66E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.265E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.502E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.89E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.238E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.80E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.001 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
11%	11%	1%	435%	20%	0%	9%	25%	0%	289%	8%	1%	6%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051230  
START TIME: 12:43:40 PST  
END TIME: 13:13:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.203	5.159	4.529	4.362	5.002	6.983	4.758

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRD REF.	SPARE A	SPARE B	VOLT. REF. B
4.033	3.873	2.511	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 139055	1421 140270	0.157	143	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZFRD REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.906	0.73	10.75	NO DATA	306.8	1014.94	-9.74E 02	13.675	287.126

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
14.027	0.23	10.43	NO DATA	-0.49	1016.04

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	14.085	15.295	15.475	9.756E-03	81.26	7.959E-03	12.925	15.906	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	14.117	15.387	15.477	9.554E-03	78.90	7.789E-03	12.662	16.049	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051230  
START TIME: 12:43:40 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.038 AT GMM	MOMENTUM FLUX (Nt/m2) -1.38E-01	FRICTION VELOCITY (Meters/sec) 3.352E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) -6.00E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.459E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.64E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.19E 00
Z/L AT GMM -0.047	LAT. HEAT FLUX (Watts/m2) -1.48E 02	SCALING POT. TEMP. (Kelvin) -2.707E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.91E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 3.71E 03
Z/L AT 10 METERS -0.036	SFN. HEAT FLUX (Watts/m2) 1.13E 01	ROUGHNESS LENGTH (Meters) 1.201E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.54E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.00E 01
Z/L AT Z1 -0.066	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.74E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.822E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.033	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.11E 03			
MONIN-OBUKHOV LENGTH (Meters) -2.788E 02	BOWEN RATIO (no units) -0.076			
PSI1 AT Z1 = 0.194582 PSI1 AT Z2 = 0.108283 PSI2 AT Z1 = 0.123071 PSI2 AT Z2 = 0.067133				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7929	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2264	2.4170E 02	5.8942E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905051230  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.012	8.29	10.47	NO DATA	1015.94	13.675	0.338	0.436	1.701	1.799

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	14.110	15.376	15.474	9.578E-03	79.18	7.808E-03	12.694	16.032	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 AT GNM	MOMENTUM FLUX (Nt/m2) -9.92E-02	FRICTION VELOCITY (Meters/sec) 2.843E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.085E-02	AIR DENSITY (Kg/m3) 1.2267
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.50E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.163E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.498E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GNM 0.010	LAT. HEAT FLUX (Watts/m2) 6.17E 01	SCALING POT. TEMP. (Kelvin) 4.651E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -1.323E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8939E 05
Z/L AT 10 METERS 0.008	SEN. HEAT FLUX (Watts/m2) -1.64E 00	ROUGHNESS LENGTH (Meters) 6.591E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.702
MONIN-OBUKHOV LENGTH (Meters) 1.274E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.74E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.177E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.14E 02			BAR. PRES. AT WT LEVEL (Millibar) 1017.14
	BOWEN RATIO (no units) -0.027			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
119%	119%	108%	108%	87%	5%	15%	195%	54%	54%	33%	74%	108%
228%	245%	46%	46%	173%	5%	5%	218%	23%	69%	196%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -1.11E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.995E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.54E-07 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 4.994E-05 [3.0E-05]
Z/L AT GNM -0.028 [0.02]	LAT. HEAT FLUX (Watts/m2) -3.82E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.255E-02 [2.0E-02]
Z/L AT 10 METERS -0.022 [0.02]	SEN. HEAT FLUX (Watts/m2) 6.95E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.580E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.636E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.74E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.351E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.67E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.053 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
186%	107%	19%	566%	98%	0%	11%	31%	9%	219%	86%	33%	26%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051300  
START TIME: 13:13:50 PST  
END TIME: 13:44:00 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.171	5.128	4.605	4.396	4.981	6.527	4.775
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.975	3.862	2.513	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION, AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	UP1FCAL	DP2FCAL	WTRFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 140000	1421 141064	0.157	137	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.1	59.86

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.000	8.88	10.56	NO DATA	307.4	1014.62	-9.10E 02	13.618	287.213
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
14.106	8.29	10.24	NO DATA	-0.40	1015.71			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	14.180	15.372	15.552	9.626E-03	79.74	7.858E-03	12.757	15.998	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	14.197	15.450	15.540	9.430E-03	77.53	7.691E-03	12.502	16.127	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051300  
START TIME: 13:13:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 AT GMM	MOMENTUM FLUX (Nt/m2) -1.62E-01	FRICTION VELOCITY (Meters/sec) 3.633E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N/SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/[Ln1-Ln2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -6.02E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.353E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.56E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.10E 00
Z/L AT GMM -0.019	LAT. HEAT FLUX (Watts/m2) -1.49E 02	SCALING POT. TEMP. (Kelvin) -1.360E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.85E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 4.00E 03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m2) 6.13E 00	ROUGHNESS LENGTH (Meters) 1.598E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.86E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.97E 01
Z/L AT Z1 -0.027	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.10E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.063E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.013	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.05E 03			
MONIN-OBUKHOV LENGTH (Meters) -6.860E 02	BOWEN RATIO (no units) -0.041			
PSI1 AT Z1= 0.089767 PSI1 AT Z2= 0.047412 PSI2 AT Z1= 0.055380 PSI2 AT Z2= 0.028893				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2257	2.416E 02	5.8937E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905051300  
 START TIME: 13:13:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.094	8.36	10.28	NO DATA	1015.62	13.618	0.475	0.573	1.822	1.920

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	14.192	15.440	15.538	9.454E-03	77.79	7.711E-03	12.533	16.112	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -1.01E-01	FRICTION VELOCITY (Meters/sec) 2.874E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.261E-02	AIR DENSITY (Kg/m3) 1.2260
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.61E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.401E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.608E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMH 0.018	LAT. HEAT FLUX (Watts/m2) 6.44E 01	SCALING POT. TEMP. (Kelvin) 8.389E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -2.411E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8934E 05
Z/L AT 10 METERS 0.014	SEN. HEAT FLUX (Watts/m2) -2.99E 00	ROUGHNESS LENGTH (Meters) 6.862E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.640
MONIN-OBUKHOV LENGTH (Meters) 7.220E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.10E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.182E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.182E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.49E 02			BAR. PRES. AT WT LEVEL (Millibar) 1016.82
	ROWEN RATIO (no units) -0.046			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
130%	130%	96%	103%	103%	5%	15%	206%	48%	55%	55%	68%	96%
193%	217%	46%	45%	145%	5%	6%	190%	23%	68%	168%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051300  
 START TIME: 13:13:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.004 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.21E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.120E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.07E-07 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 4.142E-05 [3.0E-05]
Z/L AT GMH -0.005 [0.02]	LAT. HEAT FLUX (Watts/m2) -2.67E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -8.187E-03 [2.0E-02]
Z/L AT 10 METERS -0.004 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.35E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.040E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.528E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.10E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.441E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.04E 02 [3.0E+01]	
	ROWEN RATIO (no units) -0.044 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
70%	73%	27%	572%	154%	0%	12%	3%	13%	254%	62%	45%	33%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905051330  
START TIME: 13:44:10 PST  
END TIME: 14:14:20 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.162	5.125	4.543	4.365	4.952	6.297	4.722

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.009	3.869	2.514	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 140470	1421 141516	0.157	130	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.1	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.047	8.76	10.51	NO DATA	305.6	1014.18	-8.78E 02	13.651	287.259

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)
14.152	8.23	10.22	NO DATA	-0.30	1015.28

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	14.227	15.414	15.594	9.587E-03	79.22	7.830E-03	12.708	16.04	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	14.242	15.494	15.584	9.413E-03	77.20	7.682E-03	12.481	16.167	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051330  
START TIME: 13:44:10 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD RICHARDSON NUMBER (+=Stable, -=Unstable) -0.016 AT GMM	MOMENTUM FLUX (Nt/m2) -1.32E-01	FRICTION VELOCITY (Meters/sec) 3.278E-01	GENERAL FORM: DN/DZ= [(N1-N2)/[Ln(Z1/Z2)]* (Z1+Z2)/2]	GENERAL FORM: N'SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -4.87E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.213E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 5.89E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.22F 00
Z/L AT GMM 0.021	LAT. HEAT FLUX (Watts/m2) -1.20E 02	SCALING POT. TEMP. (Kelvin) -1.219E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 1.65E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 4.46E 03
Z/L AT 10 METERS -0.016	SEN. HEAT FLUX (Watts/m2) 4.95E 00	ROUGHNESS LENGTH (Meters) 1.108E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.66E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -4.43E 01
Z/L AT Z2 -0.030	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.78E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.730E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.015	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.93E 02			
MINIM. DRUMHOV LENGTH (Meters) -6.207E 02	ROMEN RATIO (no units) -0.041			
PSI1 AT Z1= 0.098198 PSI1 AT Z2= 0.052896 PSI2 AT Z1= 0.060714 PSI2 AT Z2= 0.031793				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.921-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2250
AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4168E 02
WATER LAT. HEAT VAP. (Jcal./Kg) 5.8934E 05



RUN NUMBER: 7905051330  
 START TIME: 13:44:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.139	8.30	10.26	NO DATA	1015.19	13.651	0.488	0.586	1.832	1.930

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	14.237	15.484	15.582	9.434E-03	77.44	7.700E-03	12.509	16.152	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) 0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -9.93E-02	FRICTION VELOCITY (Meters/sec) 2.847E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.104E-02	AIR DENSITY (Kg/m3) 1.2253
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.63E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.541E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.630E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT GMH 0.019	LAT.HEAT FLUX (Watts/m2) 6.49E 01	SCALING POT.TEMP. (Kelvin) 8.673E-03	WITH POT.TEMPERATURE (Meter Kel./sec) -2.469E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8932E 05
Z/L AT 10 METERS 0.015	SEN.HEAT FLUX (Watts/m2) -5.06E 00	ROUGHNESS LENGTH (Meters) 6.620E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.667
MONIN-OBUKHOV LENGTH (Meters) 6.851E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.78E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.178E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.184E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.16E 02			BAR.PRES.AT WT LEVEL (Millibar) 1016.39
	BOWEN RATIO (no units) -0.847			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
144%	144%	106%	115%	115%	5%	14%	229%	53%	62%	62%	73%	106%
190%	215%	46%	45%	143%	5%	6%	188%	23%	68%	166%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051330  
 START TIME: 13:44:10 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.004 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.09E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.977E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.30E-06 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) 2.738E-05 [3.0E-05]
Z/L AT GMH -0.005 [0.02]	LAT.HEAT FLUX (Watts/m2) 1.31E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -6.556E-03 [2.0E-02]
Z/L AT 10 METERS -0.004 [0.02]	SEN.HEAT FLUX (Watts/m2) 1.39E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.275E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.618E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.78E 02 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.329E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.66E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.044 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL SPEC HUMIDITY	SCL POT. TEMP	ROUGH. LENGTH	DRAW COEF
75%	78%	16%	506%	134%	0%	11%	4%	8%	328%	57%	28%	24%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905051400  
START TIME: 14:14:30 PST  
END TIME: 14:44:40 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.205	0.001	0.001	5.157	5.119	4.845	4.658	4.915	5.804	4.707

No. 13	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	7-KV REF.	SPARE A	SPARE B	VOL. REF. B
4.911	5.685	2.515	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	UPWIND CAL	DOWNWIND CAL	WIND CAL	WIND CAL	WIND CAL	WIND CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.140656	1421.141405	0.157	123	-0.009	0.000	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 1) 0.005V	B(No. 2) 0.005V	(No. 3) 0.002V	(No. 1) 5V	(No. 1) 1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.1	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin-2/3)
14.361	9.34	10.47	NO DATA	305.0	1013.60	-0.09E-02	13.653	287.261

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TALL	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter ASL)	(Millibar)
14.146	8.77	10.19	NO DATA	-0.19	1014.70

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	14.240	15.425	15.605	9.559E-03	78.97	7.812E-03	12.671	16.045	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	14.231	15.479	15.569	9.387E-03	77.08	7.664E-03	12.446	16.146	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051400  
START TIME: 14:14:30 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -1.16E-01	FRICTION VELOCITY (Meters/sec) 3.083E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(N1+Z1)^2 + (N2+Z2)^2]$	GENERAL FORM: $N' SLOPE = [(N1+Z1)^2 - (N2+Z2)^2] / [(N1+Z1)^2 + (N2+Z2)^2]$
GEOMETRIC MEAN HEIGHT (Meters) $GMM = (Z1+Z2)/2$ 12.9%	HUMIDITY FLUX (Kg/sec m2) -4.02E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.064E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 6.31E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.30E-00
Z/L AT GMM 0.013	LAT. HEAT FLUX (Watts/m2) -9.91E-01	SCALING POT. TEMP. (Kelvin) 7.092E-03	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = 1.64E-05	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 5.01E-03
Z/L AT Z1 0.017	SUN. HEAT FLUX (Watts/m2) -2.71E-00	ROUGHNESS LENGTH (Meters) 8.881E-05	N=POT. TEMP (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.10E-03	N=POT. TEMP (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTM SLOPE = 7.60E-01
Z/L AT Z2 0.009	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.09E-02	DRAW (COEF. AT 10 METERS (Dimensionless) 1.30E-04		N=LNTMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE LT SLOPE=NO DATA
RUNIN DRUKNOW LENGTH (Meters) 9.884E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.11E-02			
PS11 AT Z1 = 0.087260 PS11 AT Z2 = 0.043749 PS12 AT Z1 = 0.117920 PS12 AT Z2 = 0.059120	BOWEN RATIO (No units) 0.627			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL NUMBER	PRANDTL NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.80665	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2243

AIR SPECIFIC HEAT  
(J/cal./Kg K)  
2.4167E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.8934E-01

RUN NUMBER: 7905051400  
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PRINT DATE: 11 JUN 1980  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

WIND DIR. (Degrees)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.131	8.84	10.22	NO DATA	1014.61	13.653	0.478	0.576	1.819	1.917

MOIST. (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	14.229	15.473	15.571	9.408E-03	77.31	7.682E-03	12.474	16.135	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.011 AT 10M	MOMENTUM FLUX (Nt/m2) -1.16E-01	FRICTION VELOCITY (Meters/sec) 3.080E-01	WITH LONG. VELOCITY (Meters/sec) 9.486E-02	AIR DENSITY (Kg/m3) 1.2246
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.83E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.497E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.828E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.416E 02
Z/L AT GMH 0.016	LAT. HEAT FLUX (Watts/m2) 6.98E 01	SCALING POT. TEMP. (Kelvin) 8.707E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -2.682E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.8932E 05
Z/L AT 10 METERS 0.013	SEN. HEAT FLUX (Watts/m2) -3.32E 00	ROUGHNESS LENGTH (Meters) 8.850E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.660
MONIN-OBUKHOV LENGTH (Meters) 7.988E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.09E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.214E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.43E 02			BAR. PRES. AT WT LEVEL (Millibar) 1015.81
	BOWEN RATIO (no units) -0.848			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
171%	187%	110%	119%	146%	5%	14%	265%	55%	64%	91%	75%	110%
190%	217%	46%	45%	145%	5%	6%	189%	23%	68%	168%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051400  
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MARINE SURFACE LAYER  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.010 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.16E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.081E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.83E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 1.801E-05 [3.0E-05]
Z/L AT GMH 0.015 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.38E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 7.661E 03 [2.0E-02]
Z/L AT 10 METERS 0.011 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.02E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 8.852E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 11.905E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 8.09E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.244E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.91E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.016 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
5%	6%	0%	190%	10%	0%	11%	47%	0%	302%	4%	0%	5%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905051430  
START TIME: 14:44:50 PST  
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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.182	5.135	4.681	4.520	4.889	5.225	4.602

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.008	3.833	2.516	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND 1 AND	DP1 CAL	DP2 CAL	W1 CAL	W2 CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)
1411 140371	1421 141019	0.157	116	-0.009	0.000	0.000	0.993

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	REF. AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin 2/3)
14.037	9.02	10.62	NO DATA	301.5	1013.21	-7.24E-02	13.650	207.729

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)
14.102	8.52	10.29	NO DATA	-0.07	1014.31

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	14.217	15.415	15.595	9.651E-03	79.88	7.890E-03	12.792	16.015	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	14.192	15.449	15.540	9.447E-03	77.79	7.715E-03	12.523	16.100	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051430  
START TIME: 14:44:50 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUNINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.029 At GMH	MOMENTUM FLUX (Nt/m2) -7.11E-02	FRICTION VELOCITY (Meters/sec) 2.411E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] + (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -3.12E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.058E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 5.65E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.66E-00
Z/L AT GMH 0.045	LAT. HEAT FLUX (Watts/m2) -7.70E-01	SCALING POT. TEMP. (Kelvin) 1.501E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 1.95E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 5.11E-03
Z/L AT 10 METERS 0.035	SEN. HEAT FLUX (Watts/m2) -4.48E-00	ROUGHNESS LENGTH (Meters) 3.481E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 2.77E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 3.60E-01
Z/L AT Z1 0.054	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.29E-02	DRAG COEFF. AT 10 METERS (Dimensionless) 8.76E-04		N=LnTEMP. STRUCT. (Kelvin 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.032	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.10E-02			
MUNIN-BRUKHOV LENGTH (Meters) 2.860E-02	BOWEN RATIO (no units) 0.058			
PSI1 AT Z1 = -0.30153R PSI1 AT Z2 = -0.1511H0 PSI2 AT Z1 = -0.407484 PSI2 AT Z2 = -0.204297				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2239

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4169E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8936E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905051430  
 START TIME: 14:44:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.094	8.58	10.33	NO DATA	1014.21	13.650	0.444	0.542	1.225	1.893

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	14.192	15.445	15.543	9.471E-03	78.04	7.736E-03	12.556	16.090	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.011 AT GMM	MOMENTUM FLUX (Nt/m2) -1.08E-01	FRICTION VELOCITY (Meters/sec) 2.967E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.804E-02	AIR DENSITY (Kg/m3) 1.2243
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.66E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.334E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.664E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.416E-02
Z/L AT GMM 0.015	LAT. HEAT FLUX (Watts/m2) 6.57E-01	SCALING POT. TEMP. (Kelvin) 7.686E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -2.281E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8934E-05
Z/L AT 10 METERS 0.012	SFN. HEAT FLUX (Watts/m2) -2.83E-00	ROUGHNESS LENGTH (Meters) 7.719E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.650
MONIN-ORUKHOV LENGTH (Meters) 8.396E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.29E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.196E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.182E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.66E-02			BAR. PRES. AT WT LEVEL (Millibar) 1015.41
	BOWEN RATIO (no units) -0.643			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
129%	167%	117%	115%	101%	5%	12%	216%	59%	56%	42%	79%	117%
200%	222%	46%	45%	150%	5%	6%	195%	23%	68%	173%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051430  
 START TIME: 14:44:50 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.022 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -9.75E-02 [4.0E-02]	FRICTION VELOCITY (Meters/sec) 2.811E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.03E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 2.490E-05 [3.0E-05]
Z/L AT GMM 0.033 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.55E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 1.357E-02 [2.0E-02]
Z/L AT 10 METERS 0.025 [0.02]	SFN. HEAT FLUX (Watts/m2) -3.82E-00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.222E-05 [6.0E-05]
MONIN-ORUKHOV LENGTH (Meters) 3.989E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.29E-02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.115E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.14E-02 [3.8E+01]	
	BOWEN RATIO (no units) 0.005 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
43%	46%	21%	305%	22%	0%	11%	61%	11%	300%	21%	35%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905051500  
START TIME: 15:15:00 PST  
END TIME: 15:45:10 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.204	5.155	4.346	4.147	4.874	4.472	4.504
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQ. 1	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.016	3.843	2.517	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.140798	1421.141159	0.125	75	-0.009	0.000	0.000	0.995	0.969

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No.) .005V	B (No.) .005V	(No.) .002V	(No.) 15V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.071	8.40	10.75	NO DATA	298.1	1012.98	-6.24E-02	13.658	287.253
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
14.116	7.91	10.46	NO DATA	0.05	1014.08			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
10.35	14.251	15.461	15.641	9.733E-03	80.40	7.960E-03	12.902	16.046	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
7.20	14.206	15.474	15.564	9.518E-03	78.38	7.776E-03	12.619	16.110	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051500  
START TIME: 15:15:00 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.057 AT GMM	MOMENTUM FLUX (Nt/m2) -4.35E-02	FRICTION VELOCITY (Meters/sec) 1.886E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] * (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.99E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.611E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.42E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.12E 00
Z/L AT GMM 0.103	LAT. HEAT FLUX (Watts/m2) 4.90E 01	SCALING POT. TEMP. (Kelvin) 2.092E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 2.05E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 6.29E 03
Z/L AT 10 METERS 0.079	SEN. HEAT FLUX (Watts/m2) -4.88E 00	ROUGHNESS LENGTH (Meters) 1.183E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 4.97E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 2.5HE 01
Z/L AT Z1 0.144	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.24E 02	DRAW COEF. AT 10 METERS (Dimensionless) 6.209E-04		N=Latemp. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.073	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.78E 02			
MUNIN-BRUKHOV LENGTH (Meters) 1.259E 02	BOWEN RATIO (no units) 0.180			
PSI1 AT Z1 = -0.684988 PSI1 AT Z2 = -0.343427 PSI2 AT Z1 = -0.925659 PSI2 AT Z2 = -0.464091				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (Jcal./Kg Kel.)	WATER LAT. HEAT VAP. (Jcal./Kg)
1.2235	2.4170E 02	5.8934E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905051500  
 START TIME: 15:15: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.110	7.97	10.45	NO DATA	1013.98	13.658	0.452	0.550	1.814	1.912

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	14.208	15.473	15.571	9.544E-03	78.58	7.798E-03	12.654	16.103	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.013 AT 10M	MOMENTUM FLUX (Nt/m2) -8.99E-02	FRICTION VELOCITY (Meters/sec) 2.710E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.344E-02	AIR DENSITY (Kg/m3) 1.2239
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.40E-03	SCALING SPEC. HUMID. (Kg/Kg) -7.242E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.402E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT 10M 0.018	LAT. HEAT FLUX (Watts/m2) 5.93E 01	SCALING POT. TEMP. (Kelvin) 7.507E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -2.034E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8933E 05
Z/L AT 10 METERS 0.014	SEN. HEAT FLUX (Watts/m2) -2.52E 00	ROUGHNESS LENGTH (Meters) 5.500E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.656
MONIN-OBUKHOV LENGTH (Meters) 7.173E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.24E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.156E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.67E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.10
	BOWEN RATIO (no units) -0.043			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
112%	176%	121%	117%	92%	5%	10%	209%	60%	57%	31%	80%	121%
196%	221%	46%	46%	149%	5%	6%	194%	23%	69%	172%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051500  
 START TIME: 15:15: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.041 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -7.71E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.482E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.97	HUMIDITY FLUX (Kg/sec m2) 1.17E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 1.417E-05 [3.0E-05]
Z/L AT 10M 0.065 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.90E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 1.885E-02 [2.0E-02]
Z/L AT 10 METERS 0.050 [0.02]	SEN. HEAT FLUX (Watts/m2) -3.98E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.994E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.984E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.24E 02 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 1.025E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.10E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.026 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
56%	65%	31%	204%	31%	0%	9%	89%	18%	265%	41%	38%	29%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051530  
START TIME: 15:45:20 PST  
END TIME: 16:15:30 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUCT. 1 0.001	No. 02 TEMP. STRUCT. 2 0.001	No. 03 DEW POINT 1 5.187	No. 04 DEW POINT 2 5.129	No. 05 WIND SPEED 1 4.843	No. 06 WIND SPEED 2 4.475	No. 07 BAR. PRES. 2 4.865	No. 08 SKY RAD. 3.642	No. 09 WIND DIR. 4.554
No. 10 BULK WT TEMP 3.990	No. 11 AC FREQUENCY 3.813	No. 12 AC VOLTAGE 2.516	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1 AIR TEMP. 1 1411 142038	No. 2 AIR TEMP. 2 1421 142251	UPWIND NEAR HEIGHT/LENGTH 0.125	UPWIND LAND PATH (Meters) 72	DP1/FCL (Volts) -0.009	DP2/FCL (Volts) 0.000	W1/FCL (Volts) 0.000	W2/FCL (Volts) 0.595	W3/FCL (Volts) 0.969
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	ZERO REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC FREQ. FLUX (No. scans) 0	AC VOLTAGE (VAC) 115.2	AC FREQUENCY (Hz) 59.81
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 14.204	WIND SPEED 1 (Meter/sec) 8.97	DEW POINT 1 (Celsius) 10.66	TEMP. STRUCT. 1 (Kelvin 2/3) NO DATA	WIND DIR. (Deg. True) 299.8	BAR. PRES. 1 (Millibar) 1012.86	SKY RAD. (Watt/m2) -5.08E 02	BULK WT TEMP MEAN AIR TEMP (Celsius) 13.632	MEAN AIR TEMP (Kelvin) 287.374
AIR TEMP. 2 (Celsius) 14.225	WIND SPEED 2 (Meter/sec) 8.52	DEW POINT 2 (Celsius) 10.25	TEMP. STRUCT. 2 (Kelvin 2/3) NO DATA	TIDE TABLE (Meter MSL) 0.15	BAR. PRES. 2 (Millibar) 1013.96			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 14.384	VIR. TEMP. 1 (Celsius) 15.586	V. POT. TEMP. 1 (Celsius) 15.765	ARS. HUMID. 1 (Kg/m3) 9.664E-03	REL. HUMID. 1 (Percent) 79.20	SPEC. HUMID. 1 (Kg/Kg) 7.908E-03	VAP. PRES. 1 (Millibar) 12.817	S. VAP. PRES. 1 (Millibar) 16.183	REF. INDEX 1 (Kelvin 2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 14.315	VIR. TEMP. 2 (Celsius) 15.570	V. POT. TEMP. 2 (Celsius) 15.660	ARS. HUMID. 2 (Kg/m3) 9.416E-03	REL. HUMID. 2 (Percent) 76.98	SPEC. HUMID. 2 (Kg/Kg) 7.696E-03	VAP. PRES. 2 (Millibar) 12.468	S. VAP. PRES. 2 (Millibar) 16.223	REF. INDEX 2 (Kelvin 2/3) NO DATA

## \* CONTINUED BFLOW

RUN NUMBER: 7905051530  
START TIME: 15:45:20 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.104 AT GHM	MOMENTUM FLUX (N/m2) -1.59E-02	FRICTION VELOCITY (Meters/sec) 1.139E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1/(Z1/Z2)) + (Z1+Z2)/2$	GENERAL FORM: $N \text{ SLOPE} = (1/(LN Z1 - PS1)) - (1/(LN Z2 - PS1)) / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -8.51E-06	SCALING SPEC. HUMID. (Kg/Kg) 6.110E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.98E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 3.51E 00
Z/L AT GHM 0.265	LAT. HEAT FLUX (Watts/m2) -2.10E 01	SCALING POT. TEMP. (Kelvin) 1.969E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 2.36E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 8.85E 03
Z/L AT 10 METERS 0.204	SEN. HEAT FLUX (Watts/m2) -2.78E 00	ROUGHNESS LENGTH (Meters) 4.498E-07	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 7.62E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 2.74E 01
Z/L AT Z1 0.374	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.08E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.982E-04		
Z/L AT Z2 0.188	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.32E 02			
MUNIN-BROUKHOV LENGTH (Meters) 4.903E 01	BOWEN RATIO (no units) 0.132			
PS11 AT Z1 = -1.759180 PS11 AT Z2 = -0.881986 PS12 AT Z1 = -2.377270 PS12 AT Z2 = -1.191874				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2229

AIR SPECIFIC HEAT  
(Jcal./kg Kel.)  
2.4169E 02

WATER LAT. HEAT VAP.  
(Jcal./kg)  
5.8928E 05



RUN NUMBER: 7905051530  
 START TIME: 15:45:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M/2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.223	8.58	10.30	NO DATA	1013.86	13.632	0.590	0.688	1.940	2.038

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M/2/3)
10.00	14.321	15.572	15.670	9.446E-03	77.24	7.222E-03	12.528	16.219	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEDUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) 0.016 AT GMM	MOMENTUM FLUX (Nt/m2) -1.08E-01	FRICTION VELOCITY (Meters/sec) 2.967E-01	WITH LONG. VFLOCITY (Meter2/sec2) -8.800E-02	AIR DENSITY (Kg/m3) 1.2233
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.67E-05	SCALING SPEC.HUMID. (Kg/Kg) -7.366E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.673E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4167E 02
Z/L AT GMM 0.023	LAT.HEAT FLUX (Watts/m2) 6.60E 01	SCALING POT.TEMP. (Kelvin) 1.157E-02	WITH POT.TEMPERATURE (Meter Kel./sec) -3.432E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.8927E 05
Z/L AT 10 METERS 0.018	SEN.HEAT FLUX (Watts/m2) -4.25E 00	ROUGHNESS LENGTH (Meters) 7.714E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.627
MONIN-OBUKHOV LENGTH (Meters) 5.579E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.08E 02	DRAW COEF.AT 10 METERS (Dimensionless) 1.196E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.46E 02			BAR.PRES.AT WT LEVEL (Millibar) 1015.06
	BOWEN RATIO (no units) -0.064			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
121%	248%	167%	150%	124%	5%	8%	275%	84%	67%	41%	104%	167%
175%	203%	46%	45%	131%	5%	7%	176%	23%	68%	154%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051530  
 START TIME: 15:45:20 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) 0.068 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -8.79E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.573E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.86E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -5.602E-06 [3.0E-05]
Z/L AT GMM 0.132 [0.02]	LAT.HEAT FLUX (Watts/m2) 4.59E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) 1.800E-02 [2.0E-02]
Z/L AT 10 METERS 0.102 [0.02]	SEN.HEAT FLUX (Watts/m2) -3.49E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.466E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 9.847E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.08E 02 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.004E-05 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.87E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.012 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
66%	92%	60%	108%	21%	6%	9%	126%	41%	225%	24%	69%	58%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051600  
START TIME: 16:15:40 PST  
END TIME: 16:45:50 PST  
START DATE: 5 May 1979 (DAY 12)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.205	5.139	4.999	4.828	4.862	2.853	4.581

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK MT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
5.954	6.802	2.517	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND (AND	DIFF. CAL	DIFF. CAL	DIFF. CAL	DIFF. CAL	DIFF. CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	95	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
14.11	14.527	14.1	14.160		-0.009	0.000	0.000	0.000	0.000

WS1FC	WS2EC
(Coeff.)	(Coeff.)
0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 1.005V)	B(No. 2.005V)	(No. 3.002V)	(No. 1.5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK MT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.158	7.63	10.76	NO DATA	300.8	1012.80	-3.98E-02	13.594	287.319

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
14.160	9.09	10.31	NO DATA	0.24	1013.90

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	14.338	15.549	15.729	9.734E-03	80.00	7.965E-03	12.907	16.134	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.28	14.250	15.510	15.690	9.454E-03	77.60	7.726E-03	12.536	16.154	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905051600  
START TIME: 16:15:40 PST  
START DATE: 5 May 1979 (DAY 12)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.089 AT GMM	MOMENTUM FLUX (Nt/m2) -3.23E-02	FRICTION VELOCITY (Meters/sec) 1.625E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1/Z2)^{1/2}$	GENERAL FORM: $N/SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMM = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -1.63E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.183E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.10E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.46E 00
Z/L AT GMM 0.198	LAT. HEAT FLUX (Watts/m2) -4.01E 01	SCALING POT. TEMP. (Kelvin) 2.994E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 2.66E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 6.61E 03
Z/L AT 10 METERS 0.153	SEN. HEAT FLUX (Watts/m2) -6.02E 00	ROUGHNESS LENGTH (Meters) 5.443E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 9.74E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 1.81E 01
Z/L AT Z1 0.200	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 3.445E-04		N=LnTEMP. STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.140	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.44E 02			
MONIN-ORSHKOV LENGTH (Meters) 6.554E 01	BOWEN RATIO (no units) 0.150			
PSI1 AT Z1 = -1.315910 PSI1 AT Z2 = -0.659752 PSI2 AT Z1 = 1.778267 PSI2 AT Z2 = 0.891556				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUX. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2230
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.8931E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905051600  
 START TIME: 16:15:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3) NO DATA	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.160	9.15	10.36		1013.80	13.594	0.565	0.663	1.920	2.018

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3) NO DATA
10.00	14.258	15.514	15.612	9.488E-03	77.89	7.755E-03	12.581	16.152	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.013 AT 10M	MOMENTUM FLUX (Nt/m2) -1.26E-01	FRICTION VELOCITY (Meters/sec) 3.215E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.034E-01	AIR DENSITY (Kg/m3) 1.2235
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 2.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.036E-05	WITH ABS. HUMIDITY (Meter Kg/sec.m3) 2.768E-05	AIR SPECIFIC HEAT (ITcal./Kg.Kel.) 2.4168E 02
Z/L AT 10M 0.019	LAT. HEAT FLUX (Watts/m2) 6.83E 01	SCALING POT. TEMP. (Kelvin) 1.115E-02	WITH POT. TEMPERATURE (Meter Kel./sec) -3.586E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8931E 05
Z/L AT 10 METERS 0.015	SEN. HEAT FLUX (Watts/m2) -4.44E 00	ROUGHNESS LENGTH (Meters) 1.034E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.588
MONIN-OBUKHOV LENGTH (Meters) 6.798E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.234E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.34E 02			BAR. PRES. AT WT LEVEL (Millibar) 1015.00
	BOWEN RATIO (no units) -0.065			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
105%	198%	135%	121%	97%	5%	12%	217%	68%	53%	29%	88%	135%
181%	205%	46%	45%	133%	5%	8%	179%	23%	68%	156%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051600  
 START TIME: 16:15:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.061 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.03E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.812E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 1.57E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 1.525E-05 [3.0E-05]
Z/L AT 10M 0.110 [0.02]	LAT. HEAT FLUX (Watts/m2) 3.87E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 2.701E-02 [2.0E-02]
Z/L AT 10 METERS 0.085 [0.02]	SEN. HEAT FLUX (Watts/m2) -5.36E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 7.119E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.178E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.98E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.031E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.78E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.032 [0.01]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
64%	81%	51%	154%	15%	0%	15%	135%	32%	256%	42%	73%	49%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051630  
START TIME: 16:46: 0 PST  
END TIME: 17:16:10 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.246	5.167	5.276	5.047	4.851	2.101	4.617

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	Z-FRO. REF.	SPARE A	SPARE B	VOLT. REF. B
3.899	3.836	2.522	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIFD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WS1FC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 141421	1421 141388	0.157	90	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	Z-FRO. REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.142	10.16	11.00	NO DATA	302.0	1012.63	-2.93E 02	13.535	287.300

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-M-2/3)	(Meter MSL)	(Millibar)
14.139	9.49	10.47	NO DATA	0.32	1013.73

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
18.35	14.322	15.556	15.736	9.891E-03	81.38	8.095E-03	13.115	16.115	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-M-2/3)
9.20	14.229	15.504	15.594	9.559E-03	78.58	7.813E-03	12.674	16.129	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051630  
START TIME: 16:46: 0 PST  
START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.063 AT GMH	MOMENTUM FLUX (Nt/m2) -7.65E-02	FRICTION VELOCITY (Meters/sec) 2.501E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(\ln(Z1/Z2))] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(\ln Z1 - PSI1) - (\ln Z2 - PSI2)] / (N1 - N2)$
ISOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -3.85E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.260E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 7.49E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.60E 00
Z/L AT GMH 0.116	LAT. HEAT FLUX (Watts/m2) 9.50E 01	SCALING POT. TEMP. (Kelvin) 4.150E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 3.15E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 4.29E 03
Z/L AT 10 METERS 0.090	SEN. HEAT FLUX (Watts/m2) -1.28E 01	ROUGHNESS LENGTH (Meters) 4.027E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.04E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 1.30E 01
Z/L AT Z1 0.164	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.93E 02	DRAW COEF. AT 10 METERS (Dimensionless) 7.252E-04		N=Ln TEMP. STRUCT. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.082	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.01E 02			
MUNIN-BRUKHOV LENGTH (Meters) 1.117E 02	ROMEN RATIO (no units) 0.135			
PSI1 AT Z1= -0.772255 PSI1 AT Z2= -0.387179 PSI2 AT Z1= -1.043587 PSI2 AT Z2= -0.523215				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2228

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4172E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8932E 05

RUN NUMBER: 7905051630  
 START TIME: 16:46: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
14.139	9.57	10.54	NO DATA	1013.63	13.535	0.604	0.702	1.975	2.073

HFIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	14.237	15.510	15.608	9.599E-03	78.91	7.846E-03	12.727	16.128	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -1.41E-01	FRICTION VELOCITY (Meters/sec) 3.401E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.156E-01	AIR DENSITY (Kg/m3) 1.2233
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.70E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.487E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.699E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH 0.019	LAT. HEAT FLUX (Watts/m2) 6.66E 01	SCALING POT. TEMP. (Kelvin) 1.230E-02	WITH POT. TEMPERATURE (Meter Kel./sec) -4.182E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8932E 05
Z/L AT 10 METERS 0.015	SEN. HEAT FLUX (Watts/m2) -5.18E 00	ROUGHNESS LENGTH (Meters) 1.264E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.525
MONIN-OBUKHOV LENGTH (Meters) 6.895E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.93E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.262E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.32E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.83
	BOWEN RATIO (no units) -0.078			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
90%	147%	105%	93%	73%	5%	22%	165%	53%	40%	20%	73%	105%
178%	201%	46%	47%	129%	5%	10%	176%	23%	70%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051630  
 START TIME: 16:46: 0 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.046 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.22E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.127E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.00E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 5.644E-05 [3.0E-05]
Z/L AT GMH 0.075 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.23E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 3.807E-02 [2.0E-02]
Z/L AT 10 METERS 0.058 [0.02]	SEN. HEAT FLUX (Watts/m2) -1.01E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 9.438E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.728E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.93E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.114E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.03E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.032 [0.01]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER) ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
57%	66%	29%	425%	39%	0%	32%	131%	15%	175%	48%	47%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905051700  
START TIME: 17:16:20 PST  
END TIME: 17:46:30 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL: RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	5.333	5.237	5.751	5.502	4.836	1.295	4.573

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
5.854	3.850	2.524	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 140446	1421 140608	0.157	87	-0.009	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(Ne.).005V	B(Ne.).005V	(Ne.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
14.045	11.08	11.52	NO DATA	300.5	1012.40	-1.81E 02	13.500	287.213

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
14.061	10.33	10.89	NO DATA	0.37	1013.50

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S.VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	14.224	15.508	15.608	1.024E-02	84.76	8.379E-03	13.569	16.010	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S.VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	14.151	15.464	15.554	9.830E-03	81.22	8.036E-03	13.030	16.044	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905051700  
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MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

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NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (=Stable, =Unstable) 0.040	MOMENTUM FLUX (Nt/m2) -1.31E-01	FRICTION VELOCITY (Meters/sec) 5.276E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2)+ (Z1+Z2)/2]	GENERAL FORM: 'N SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -7.54E-05	SCALING SPEC. HUMID. (Kg/Kg) 1.882E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 8.30E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.2E 00
Z/L AT GMH 0.066	LAT. HEAT FLUX (Watts/m2) -1.86E 02	SCALING POT. TEMP. (Kelvin) 4.030E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= 3.82E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 2.87E 03
Z/L AT 10 METERS 0.051	SEN. HEAT FLUX (Watts/m2) -1.63E 01	ROUGHNESS LENGTH (Meters) 1.106E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 8.19E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 1.34E 01
Z/L AT Z1 0.075	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.81E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.032E-03		N=TEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.047	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.83E 02			
MONIN-OBUKHOV LENGTH (Meters) 1.769E 02	ROSEN RATIO (no units) 0.088			
PSI1 AT Z1= -0.437989 PSI1 AT Z2= -0.219591 PSI2 AT Z1= -0.591877 PSI2 AT Z2= -0.296745				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2227

AIR SPECIFIC HEAT (Jcal./Kg Kel.)
2.4177E 02

WATER LAT. HEAT VAP. (Jcal./Kg)
5.8937E 03

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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
14.059	10.42	10.97	NO DATA	1013.40	13.500	0.558	0.656	1.969	2.067

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	14.157	15.469	15.567	9.879E-03	81.64	8.076E-03	13.095	16.040	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
KAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.010 AT 10M	MOMENTUM FLUX (Nt/m2) -1.75E-01	FRICTION VELOCITY (Meters/sec) 3.783E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.431E-01	AIR DENSITY (Kg/m3) 1.2232
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.51E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.432E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.514E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4174E 02
Z/L AT 10M 0.014	LAT. HEAT FLUX (Watts/m2) 6.20E 01	SCALING POT. TEMP. (Kelvin) 1.135E-02	WITH POT. TEMPERATURE (Meter Kel./sec) -4.294E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8936E 05
Z/L AT 10 METERS 0.011	SEN. HEAT FLUX (Watts/m2) -5.32E 00	ROUGHNESS LENGTH (Meters) 1.843E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.487
MONIN-OBUKHOV LENGTH (Meters) 9.244E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.81E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.318E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.24E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.60
	BOWEN RATIO (no units) -0.086			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
91%	128%	98%	81%	68%	5%	39%	149%	49%	32%	19%	69%	98%
187%	206%	46%	50%	134%	5%	13%	184%	23%	73%	157%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
KAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.030 10.021 AT 10M	MOMENTUM FLUX (Nt/m2) -1.61E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.621E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.33E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 1.144E-04 [3.0E-05]
Z/L AT 10M 0.046 10.021	LAT. HEAT FLUX (Watts/m2) -3.28E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 3.712E-02 [2.0E-02]
Z/L AT 10 METERS 0.035 10.021	SEN. HEAT FLUX (Watts/m2) -1.26E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.560E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 2.821E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.81E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.235E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.90E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.010 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE 10% WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
53%	58%	14%	38%	46%	0%	76%	109%	7%	114%	49%	24%	13%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
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RUN NUMBER: 7905051730  
START TIME: 17:46:40 PST  
END TIME: 18:16:50 PST  
START DATE: 5 May 1979 (DAY 125)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	PAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.476	5.307	5.863	5.655	4.830	0.688	4.461

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF	SPARE A	SPARE B	VOLT REF B
3.788	3.867	2.519	0.001	0.001	0.001	0.001	0.005

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND FAND	DPT FCAI	DPT FCAI	WPT FCAI	WPT FCAI	WPT FCAI	WPT FCAI
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 138562	1421 138950	0.125	64	-0.009	0.100	0.000	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AL VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.)(.005V)	B(No.)(.005V)	(No.)(.002V)	(No.)(5V)	(No.)(Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.2	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	PAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
13.856	11.31	12.07	NO DATA	296.6	1012.31	-8.37E-01	13.435	267.03C

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	PAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.895	10.73	11.31	NO DATA	0.39	1013.41

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDX. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	14.036	15.373	15.553	1.062E-02	88.98	8.691E-03	14.071	15.814	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDX. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.985	15.337	15.427	1.011E-02	84.41	8.263E-03	13.396	15.821	NO DATA

## \* CONTINUED BELOW

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## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, WITH HEIG. 1) (-DECR, WITH HEIG. 2)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.045 AT GMH	MOMENTUM FLUX (Nt/m2) -7.59E-02	FRICTION VELOCITY (Meters/sec) 2.491E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) \cdot 1/\ln(Z1/Z2)$	GENERAL FORM: $N'SLOPE = 1/(\ln Z1 - PS1) - 1/(\ln Z2 - PS1)$ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) -6.85E-05	SCALING SPEC. HUMID. (Kg/Kg) 2.248E-04	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) $DWS/DZ = 6.53E-02$	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.61E-00
Z/L AT GMH 0.076	LAT. HEAT FLUX (Watts/m2) -1.69E-02	SCALING POT. TEMP. (Kelvin) 2.673E-02	P= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) $DSH/DZ = 4.77E-05$	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 2.40E-03
Z/L AT 10 METERS 0.058	SEN. HEAT FLUX (Watts/m2) -8.25E-00	ROUGHNESS LENGTH (Meters) 3.96E-05	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) $DPT/DZ = 5.37E-03$	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 2.04E-01
Z/L AT Z1 0.107	SKY AND SOLAR HEAT FLUX (Watts/m2) -R.37E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 5.702E-04		N= LAT. HEAT STRUCT. (KvN-2/3) Z= HEIGHT (M) Vert. Axis PS1=NONE LT SLOPE=NO DATA
Z/L AT Z2 0.054	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.61E-02			
MONIN-OBUKHOV LENGTH (Meters) 1.718E-02	ROSEN RATIO (no units) 0.049			
PS11 AT Z1 = -0.502106 PS11 AT Z2 = -0.251737 PS12 AT Z1 = -0.678521 PS12 AT Z2 = -0.340185				

## \* GENERAL CONSTANTS:

VON KARMAN	GRAVITATION	PROFILE	PROFILE	BULK	BULK
CONSTANT	ACCELERATION	TUR. PRANDTL	TUR. SCHMIDT	SEN HEAT	MOISTURE
(No units)	(M/sec 2)	NUMBER	NUMBER	TRANSF. COEFF.	TRANSF. COEF
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

NONE

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2231

AIR SPECIFIC HEAT  
(J/Kg K)  
2.418E-02

WATER LAT. HEAT VAP  
(J/Kg)  
5.8947E-06



RUN NUMBER: 7905051730  
 START TIME: 17:46:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
13.890	10.80	11.40	NO DATA	1013.32	13.435	0.455	0.553	1.906	2.804

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.988	15.341	15.459	1.017E-02	84.95	8.314E-03	13.476	15.864	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 AT GMH	MOMENTUM FLUX (Nt/m2) -1.92E-01	FRICTION VELOCITY (Meters/sec) 3.957E-01	WITH LONG. VLOCITY (Meter2/sec2) -1.565E-01	AIR DENSITY (Kg/m3) 1.2236
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.12E-05	SCALING SPEC. HUMID. (Kg/Kg) -4.173E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 2.117E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4180E 02
Z/L AT GMH 0.010	LAT. HEAT FLUX (Watts/m2) 5.23E 01	SCALING POT. TEMP. (Kelvin) 8.834E-03	WITH POT. TEMPERATURE (Meter Kel./sec) -3.495E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8946E 05
Z/L AT 10 METERS 0.008	SEN. HEAT FLUX (Watts/m2) -4.33E 00	ROUGHNESS LENGTH (Meters) 2.156E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.420
MONIN-OBUKHOV LENGTH (Meters) 1.298E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.37E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.343E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.58E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.52
	BOWEN RATIO (no units) -0.083			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-";

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
121%	176%	130%	96%	93%	6%	62%	188%	65%	31%	28%	85%	130%
296%	220%	46%	55%	148%	6%	21%	203%	23%	78%	171%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905051730  
 START TIME: 17:46:40 PST  
 START DATE: 5 May 1979 (DAY 125)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.031 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.61E-01 (1.6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.573E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) -1.14E-05 (8.0E-06)	SCALING SP+C. HUMID. (Kg/Kg) 1.487E-04 (3.0E-05)
Z/L AT GMH 0.047 (0.02)	LAT. HEAT FLUX (Watts/m2) -2.85E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.423E-02 (2.0E-02)
Z/L AT 10 METERS 0.036 (0.02)	SEN. HEAT FLUX (Watts/m2) -6.74E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.564E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 2.792E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.37E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.160E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.33E 01 (3.0E+01)	
	BOWEN RATIO (no units) -0.014 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-";

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
63%	71%	40%	402%	30%	0%	134%	82%	23%	98%	46%	59%	36%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071300  
START TIME: 13: 0: 0 PST  
END TIME: 13:29:30 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.127	5.202	6.788	6.500	4.798	6.484	4.742

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.365	3.810	2.527	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 137999	1421 139107	0.157	147	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .05V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.830	13.06	10.30	NO DATA	306.2	1011.82	-9.04E 02	13.998	287.015

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)
13.911	12.18	10.39	NO DATA	-0.55	1012.92

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
13.35	13.988	15.148	15.327	9.444E-03	79.41	7.724E-03	12.506	15.748	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	14.001	15.266	15.377	9.504E-03	79.29	7.768E-03	12.591	15.879	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071300  
START TIME: 13: 0: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT 6M	MOMENTUM FLUX (Nt/m2) -3.48E-01	FRICTION VELOCITY (Meters/sec) 5.337E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1/Ln(Z1/Z2))$ (Z1=Z2)/2	GENERAL FORM: $N'SLOPE = (LnZ1-PSI1)-(LnZ2-PSI2))/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 4.10E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.410E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 9.89E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.50E-01
Z/L AT 6M -0.011	LAT. HEAT FLUX (Watts/m2) 1.03E 02	SCALING POT. TEMP. (Kelvin) -1.687E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.43E 03
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 1.11E 01	ROUGHNESS LENGTH (Meters) 5.983E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.35E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.20E 01
Z/L AT Z1 -0.015	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.04E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.91E-03		N=LnTEMP. STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MINI-ORUKHOU LENGTH (Meters) -1.213E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.90E 02			
PSI1 AT Z1= 0.053096 PSI1 AT Z2= 0.027478 PSI2 AT Z1= 0.032413 PSI2 AT Z2= 3.016640	ROSEN RATIO (no units) 0.108			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT	GRAVITATION ACCELERATION	PR. FILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
(No units) 0.4	(M/sec 2) 9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- .00E-3 kg/Kg

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2232

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8948E 05

RUN NUMBER: 7905071300  
 START TIME: 13: 0: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
13.897	12.28	10.38	NO DATA	1012.82	13.998	-0.101	-0.003	1.254	1.352

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.995	15.252	15.350	9.497E-03	79.31	7.762E-03	12.581	15.864	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.003 AT GMH	MOMENTUM FLUX (Nt/m2) -2.66E-01	FRICTION VELOCITY (Meters/sec) 4.662E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.173E-01	AIR DENSITY (Kg/m3) 1.2234
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.16E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.297E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.16E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4168E 02
Z/L AT GMH -0.004	LAT. HEAT FLUX (Watts/m2) 1.03E 02	SCALING POT. TEMP. (Kelvin) -4.361E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 2.033E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8945E 05
Z/L AT 10 METERS -0.003	SEN. HEAT FLUX (Watts/m2) 2.52E 00	ROUGHNESS LENGTH (Meters) 3.796E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.987
MONIN-OBUKHOV LENGTH (Meters) -3.651E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.04E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.441E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.206E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.99E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.02
	BOWEN RATIO (no units) 0.025			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
118%	118%	92%	152%	90%	5%	16%	242%	46%	106%	44%	66%	92%
17264%	17264%	46%	44%	17192%	5%	43%	17235%	23%	67%	17215%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071300  
 START TIME: 13: 0: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.93E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.887E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.17E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -6.95E-05 [3.0E-05]
Z/L AT GMH -0.011 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.03E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.684E-02 [2.0E-02]
Z/L AT 10 METERS -0.008 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.11E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 4.659E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.219E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.04E 02 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.585E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.92E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.107 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
17%	19%	15%	0%	55%	0%	1%	54%	7%	7%	44%	24%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071330  
START TIME: 13:30: 0 PST  
END TIME: 14: 0: 0 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD	WIND DIR
6.205	0.001	0.001	5.124	5.200	6.474	6.218	4.796	6.201	4.692

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.414	3.826	2.531	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPIFCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 137776	1421 138699	0.157	143	-0.008	-0.050	0.000	0.993	0.999

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.778	12.46	10.28	NO DATA	304.5	1011.78	-8.65E-02	14.046	286.9H4

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.870	11.65	10.37	NO DATA	-0.49	1012.88

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.957	15.123	15.383	9.432E-03	79.43	7.714E-03	12.490	15.725	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.960	15.224	15.314	9.496E-03	79.43	7.761E-03	12.579	15.837	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071330  
START TIME: 13:30: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.004 AT GMH	MOMENTUM FLUX (Nt/m2) -2.77E-01	FRICTION VELOCITY (Meters/sec) 4.758E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1*Z2)/1/2]	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 3.69E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.333E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 8.99E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 8.41E-01
Z/L AT GMH -0.005	LAT. HEAT FLUX (Watts/m2) 9.10E-01	SCALING POT. TEMP. (Kelvin) -6.333E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.53E-03
Z/L AT 10 METERS -0.004	SEN. HEAT FLUX (Watts/m2) 3.73E-01	ROUGHNESS LENGTH (Meters) 4.070E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.53E-01
Z/L AT Z1 -0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.65E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.688E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.70E-02			
MONIN-OBUKHOV LENGTH (Meters) -2.602E-03	ROSEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.025616 PSI1 AT Z2 = 0.013945 PSI2 AT Z1 = 0.015503 PSI2 AT Z2 = 0.007862				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK BFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2233	2.4167E-02	5.8950E-05

\* GENERAL NOTE:  
Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001-3 Kg/Kg.  
PTK1-PTK2 = +/- .008 Kel.

RUN NUMBER: 7905071330  
 START TIME: 13:30: 0 PST  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V.POT-WT TEMP. (Kelvin)
13.859	11.75	10.36	NO DATA	1012.79	14.046	-0.187	-0.089	1.166	1.264

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.957	15.212	15.310	9.489E-03	79.43	7.755E-03	12.568	15.824	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 AT GMM	MOMENTUM FLUX (Nt/m2) -2.37E-01	FRICTION VELOCITY (Meters/sec) 4.40E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.941E-01	AIR DENSITY (Kg/m3) 1.2235
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.05E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.510E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.048E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4168E 02
Z/L AT GMM -0.006	LAT. HEAT FLUX (Watts/m2) 9.99E 01	SCALING POT. TEMP. (Kelvin) -6.720E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 2.960E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.8948E 05
Z/L AT 10 METERS -0.005	SEN. HEAT FLUX (Watts/m2) 3.67E 00	ROUGHNESS LENGTH (Meters) 3.128E-04		VAP. PRES. AT WT LEVEL (Millibar) 16.036
MONIN-OBUKHOV LENGTH (Meters) -2.116E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.65E 02	DRAW COFF. AT 10 METERS (Dimensionless) 1.406E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.210E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.61E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.99
	BOWEN RATIO (no units) 0.037			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
184%	184%	103%	161%	161%	5%	16%	321%	51%	109%	109%	71%	103%
693%	693%	46%	43%	621%	5%	7%	664%	23%	66%	644%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071330  
 START TIME: 13:30: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.004 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -2.50E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.515E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.97E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.064E-05 [3.0E-05]
Z/L AT GMM -0.005 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.80E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -6.389E-03 [2.0E-02]
Z/L AT 10 METERS -0.004 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.72E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.483E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.482E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.65E 02 [2.0E+01]	DRAW COFF. AT 10 METERS (Meters) 1.445E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.64E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.040 [0.081]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
3%	3%	8%	5%	1%	0%	1%	3%	4%	9%	1%	14%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071400  
START TIME: 14: 0:10 PST  
END TIME: 14:30:20 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	5.079	5.154	6.385	6.163	4.780	5.826	4.620
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF	SPARE A	SPARE B	VOLT.REF.B		
4.403	5.913	2.034	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND (AND	DP1FCAL	DP2FCAL	W1BFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 137402	1411 138275	0.157	137	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERRDR	JUNT	DATA RATE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.740	12.29	10.00	NO DATA	302.1	1011.4	-8.13E-02	14.035	286.944
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
13.827	11.55	10.10	NO DATA	-0.40	1012.64			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.920	15.062	15.242	9.265E-03	78.22	7.578E-03	12.268	15.683	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.918	15.157	15.247	9.323E-03	78.21	7.619E-03	12.348	15.789	NO DATA

\* CONTINUED Below

RUN NUMBER: 7905071400  
START TIME: 14: 0:10 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.004 AT GMM	MOMENTUM FLUX (Nt/m2) -2.33E-01	FRICTION VELOCITY (Meters/sec) 4.365E-01	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(\ln(Z1/Z2))^2]$	GENERAL FORM: $N'SLOPE = [(N1-Z1-PS1) - (N2-Z2-PS2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMM = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.39E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.347E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 8.32E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 9.16E-01
Z/L AT GMM 0.006	LAT. HEAT FLUX (Watts/m2) 8.36E-01	SCALING POT. TEMP. (Kelvin) -6.347E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.52E-03
Z/L AT 10 METERS -0.005	SEN. HEAT FLUX (Watts/m2) 3.43E-00	ROUGHNESS LENGTH (Meters) 3.029E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -8.52E-01
Z/L AT Z1 -0.001	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.13E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.463E-03	N=LNTMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE	CT2 SLOPE=NO DATA
Z/L AT Z2 0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.25E-02			
MINI-DRUKHOV LENGTH (Meters) -2.179E-03	ROSEN RATIO (no units) 0.041			
PS11 AT Z1 = 0.030400 PS11 AT Z2 = 0.015526 PS12 AT Z1 = 0.018427 PS12 AT Z2 = 0.009565				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2: +/- .00E 3 Kg/Kg  
PTK1-PTK2: +/- .00E Kel.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2232

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4164E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.8952E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905071400  
 START TIME: 14: 0:10 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.817	11.64	10.09	NO DATA	1012.55	14.035	-0.218	-0.120	1.110	1.208

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.915	15.145	15.243	9.317E-03	78.21	7.614E-03	12.339	15.777	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 AT GMM	MOMENTUM FLUX (Nt/m2) -2.37E-01	FRICTION VELOCITY (Meters/sec) 4.353E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.895E-01	AIR DENSITY (Kg/m3) 1.2235
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.26E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.995E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.258E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMM -0.007	LAT. HEAT FLUX (Watts/m2) 1.05E 02	SCALING POT. TEMP. (Kelvin) -7.552E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 3.28E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8950E 05
Z/L AT 10 METERS -0.005	SEN. HEAT FLUX (Watts/m2) 4.07E 00	ROUGHNESS LENGTH (Meters) 3.002E-04		VAP. PRES. AT WT LEVEL (Millibar) 16.021
MONIN-OBUKHOV LENGTH (Meters) -1.838E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.13E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.398E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.209E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.03E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.75
	BOWEN RATIO (no units) 0.039			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
191%	191%	110%	165%	165%	5%	16%	330%	55%	110%	110%	75%	110%
546%	546%	46%	42%	474%	5%	7%	516%	23%	65%	497%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071400  
 START TIME: 14: 1:10 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -2.37E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.357E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.01E 05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.379E-05 [3.0E-05]
Z/L AT GMM -0.006 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.01E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -6.585E-03 [2.0E-02]
Z/L AT 10 METERS -0.005 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.59E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.012E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.079E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.13E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.410E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.10E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.040 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
2%	2%	8%	12%	10%	0%	2%	1%	0%	12%	4%	0%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071430  
START TIME: 14:30:30 PST  
END TIME: 15:04:00 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	5.101	5.171	6.393	6.157	4.771	5.088	4.517

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQ. 1	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.384	3.820	2.536	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 136923	1421 137706	0.125	HS	-0.008	-0.050	0.000	0.995	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Celsius)
13.492	12.33	10.15	NO DATA	298.6	1011.40	-7.10E 02	14.017	286.891

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.771	11.66	10.20	NO DATA	-0.29	1012.50

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.872	15.025	15.205	9.344E-03	79.14	7.643E-03	12.370	15.632	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.861	15.109	15.199	9.389E-03	79.03	7.672E-03	12.431	15.729	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905071430  
START TIME: 14:30:30 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.008 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.66E-01	FRICITION VELOCITY (Meters/sec) 3.681E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[ln(Z1/Z2)] + (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(lnZ1-PSI)-(lnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 2.63E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.852E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 7.45E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.09E 00
Z/L AT GMH 0.011	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 6.50E 01	SCALING POT. TEMP. (Kelvin) 8.338E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.24E 03
Z/L AT 10 METERS 0.008	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -3.80E 00	ROUGHNESS LENGTH (Meters) 1.673E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.27E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 6.48E 01
Z/L AT Z1 0.015	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 7.10E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.033E-03		N=Ln TEMP. STRUC. (Kelvin-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.008	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -6.48E 02			
MONIN-OBUKHOV LENGTH (Meters) 1.196E 03	BOWEN RATIO (no units) -0.058			
PSI1 AT Z1 = -0.072090 PSI1 AT Z2 = -0.036143 PSI2 AT Z1 = -0.097419 PSI2 AT Z2 = -0.048842				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2233

AIR SPECIFIC HEAT  
(ITcal./Kg Kel)  
2.4165E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.8955E 04

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905071430  
 START TIME: 14:30:30 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.761	11.74	10.20	NO DATA	1012.40	14.017	-0.255	-0.157	1.082	1.180
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.059	15.099	15.197	9.383E-03	79.05	7.668E-03	12.424	15.718	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 AT GMH	MOMENTUM FLUX (Nt/m2) -2.37E-01	FRICTION VELOCITY (Meters/sec) 4.402E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.938E-01	AIR DENSITY (Kg/m3) 1.2236
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.749E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.169E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4166E 02
Z/L AT GMH -0.008	LAT. HEAT FLUX (Watts/m2) 1.03E 02	SCALING POT. TEMP. (Kelvin) -8.408E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 3.701E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8953E 05
Z/L AT 10 METERS -0.006	SEN. HEAT FLUX (Watts/m2) 4.58E 00	ROUGHNESS LENGTH (Meters) 3.119E-04		VAP. PRES. AT WT LEVEL (Millibar) 16.000
MONIN-OBUKHOV LENGTH (Meters) -1.688E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.10E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.405E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.207E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.02E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.60
	BOWEN RATIO (no units) 0.045			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
171%	184%	120%	170%	140%	5%	15%	309%	60%	110%	80%	80%	120%
448%	448%	46%	43%	376%	5%	7%	418%	23%	66%	399%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071430  
 START TIME: 14:30:30 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.004 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.17E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.202E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.86E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.032E-05 [3.0E-05]
Z/L AT GMH 0.005 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.53E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 5.542E-03 [2.0E-02]
Z/L AT 10 METERS 0.004 [0.02]	SEN. HEAT FLUX (Watts/m2) -1.52E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.613E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 2.383E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.10E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.312E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.17E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.015 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
37%	39%	18%	23%	154%	0%	4%	65%	9%	14%	50%	29%	16%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071500  
START TIME: 15: 0:50 PST  
END TIME: 15:31: 0 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.076	5.152	6.825	6.368	4.752	4.499	4.444
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.367	3.835	2.535	0.001	0.001	0.901	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTF1CAL	WTF2CAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HFIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 136615	1421 137168	0.125	81	-0.008	-0.050	0.000	0.995	0.969	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >SV)	(No. >1Hz)	(VAC)	(Hz)
9	0	180	0	0	0	0	0	115.4	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.662	13.16	10.00	NO DATA	296.1	1011.11	-6.27E 02	14.000	286.849
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
13.717	12.06	10.09	NO DATA	-0.16	1012.21			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.841	14.981	15.161	9.252E-03	78.53	7.568E-03	12.247	15.596	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.807	15.045	15.135	9.314E-03	78.70	7.613E-03	12.332	15.669	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071500  
START TIME: 15: 0:50 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSTINGER, 1973):

STABILITY	FLUX PARAMETER 1 (=UP, =DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (=INCR. WITH HEIGHT)
(RAD. RICHARDSON NUMBER (=Stable, =Unstable) 0.009 AT GMM	MOMENTUM FLUX (N/m2) -4.47E-01	FRICTION VELOCITY (Meters/sec) 6.046E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(LN(Z1/Z2)* (Z1*Z2))^(1/2)]	GENERAL FORM: 'N' SLOPE = [(LN(Z1-PSI)-(LN(Z2-PSI))/ (N1-N2)]
ISOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 4.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.819E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.23E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 6.62E-01
Z/L AT GMM 0.012	LAT. HEAT FLUX (Watts/m2) 1.06E 02	SCALING POT. TEMP. (Kelvin) 2.497E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.30E 03
Z/L AT 10 METERS 0.009	SEN. HEAT FLUX (Watts/m2) -1.87E 01	ROUGHNESS LENGTH (Meters) 8.970E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 3.83E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 2.14E 01
Z/L AT Z1 0.017	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.27E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 2.423E-03	N=TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA	
Z/L AT Z2 0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.40E 02			
MININ-BUKHOV LENGTH (Meters) 1.078E 03	BOWEN RATIO (no units) -0.176			
PSI1 AT Z1= -0.080025 PSI1 AT Z2= -0.040121 PSI2 AT Z1= -0.108142 PSI2 AT Z2= -0.054218				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (kg/m3)	AIR SPECIFIC HEAT (J/cal./Kg Kel.)	WATER LAT. HEAT VAP. (J/cal./Kg)
1.2231	2.4164E 02	5.8957E 05

RUN NUMBER: 7905071500  
 START TIME: 15: 0:50 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3)	BAR. PRES. (Millibars)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.718	12.19	10.0R	NO DATA	1012.11	14.000	-0.290	-0.192	1.037	1.135

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xm-2/3)
10.00	13.808	15.037	15.135	9.307E-03	78.68	7.607E-03	12.322	15.661	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 AT GMH	MOMENTUM FLUX (Nt/m2) -2.61E-01	FRICTION VELOCITY (Meters/sec) 4.617E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.132E-01	AIR DENSITY (Kg/m3) 1.2235
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.832E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.424E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.007	LAT. HEAT FLUX (Watts/m2) 1.09E 02	SCALING POT. TEMP. (Kelvin) -8.999E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 4.155E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.8956E 05
Z/L AT 10 METERS -0.006	SEN. HEAT FLUX (Watts/m2) 5.14E 00	ROUGHNESS LENGTH (Meters) 3.672E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.978
MONIN-OBUKHOV LENGTH (Meters) -1.734E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.27E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.35E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.206E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.13E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.31
	BOWEN RATIO (no units) 0.047			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+ or -":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
87%	95%	74%	142%	65%	5%	21%	207%	37%	105%	28%	57%	74%
390%	390%	46%	43%	318%	5%	8%	361%	23%	66%	341%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071500  
 START TIME: 15: 0:50 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -3.32E-01 (4.0E-02)	FRICTION VELOCITY (Meters/sec) 5.165E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.39E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.055E-05 (3.0E-05)
Z/L AT GMH 0.008 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.08E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.237E-02 (2.0E-02)
Z/L AT 10 METERS 0.006 (0.02)	SEN. HEAT FLUX (Watts/m2) -1.46E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.950E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.577E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.27E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.78E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.21E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.095 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+ or -":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
42%	44%	29%	2%	98%	0%	3%	122%	14%	15%	99%	45%	29%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071700  
START TIME: 17: 2:10 PST  
END TIME: 17:32:20 PST  
START DATE: May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND DIR. 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.096	5.170	6.339	6.033	4.744	1.658	4.651
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.288	3.804	2.539	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W3FCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 135940	1421 136480	0.157	88	-0.008	-0.050	0.000	0.993	0.993

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.4	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR. 1	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.594	12.20	10.12	NO DATA	303.2	1011.00	-2.31E-02	13.923	286.781
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
13.648	11.31	10.19	NO DATA	0.36	1012.10			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.774	14.924	15.104	9.327E-03	79.50	7.629E-03	12.343	15.526	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.738	14.985	15.075	9.382E-03	79.62	7.667E-03	12.418	15.598	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905071700  
START TIME: 17: 2:10 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014 AT GMM	MOMENTUM FLUX (Nt/m2) -2.71E-01	FRICTION VELOCITY (Meters/sec) 4.11E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1*Z2)^{1/2}]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)^{1/2}$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.554E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 9.92E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 8.49E-01
Z/L AT GMM 0.020	LAT. HEAT FLUX (Watts/m2) 7.90E 01	SCALING POT. TEMP. (Kelvin) 2.479E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.73E-03
Z/L AT 10 METERS 0.015	SFN. HEAT FLUX (Watts/m2) -1.45E 01	ROUGHNESS LENGTH (Meters) 3.934E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 3.98E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 2.11E 01
Z/L AT Z1 0.020	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.31E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.731E-03		N=LnTEMP. STRUC. (K-m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.014	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.67E 02			
MONIN-OBUKHOV LENGTH (Meters) 6.594E 02	ROMEN RATIO (no units) -0.183			
PSI1 AT Z1 = -0.138784 PSI1 AT Z2 = -0.065570 PSI2 AT Z1 = -0.176735 PSI2 AT Z2 = -0.088608				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SFN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2232

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel)  
2.4165E 02

WATER LAT. HEAT VAP  
(J/cal./Kg)  
5.8961E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905071700  
 START TIME: 17: 2:10 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.641	11.42	10.18	NO DATA	1012.00	13.923	-0.281	-0.183	1.055	1.153

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.739	14.978	15.076	9.374E-03	79.60	7.667E-03	12.410	15.589	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.007 AT 10M	MOMENTUM FLUX (Nt/m2) -2.31E-01	FRICTION VELOCITY (Meters/sec) 4.248E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.805E-01	AIR DENSITY (Kg/m3) 1.2236
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.95E-05	SCALING SPFC. HUMID. (Kg/Kg) -7.605E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.953E-05	AIR SPECIFIC HEAT (J/Kcal./Kg Kel.) 2.4166E 02
Z/L AT 10M -0.009	LAT. HEAT FLUX (Watts/m2) 9.76E 01	SCALING POT. TEMP. (Kelvin) -9.237E-03	WITH POT. TEMPERATURE (Meter Kel./sec) 3.924E-03	WATER LAT. HEAT VAP (J/Kcal./Kg) 5.8960E 05
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m2) 4.86E 00	ROUGHNESS LENGTH (Meters) 2.759E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.896
MONIN-OBUKHOV LENGTH (Meters) -1.430E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.31E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.384E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.200E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.29E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.20
	BOWEN RATIO (no units) 0.050			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF
96%	110%	86%	149%	71%	5%	37%	220%	43%	106%	28%	63%	86%
403%	403%	46%	43%	331%	5%	14%	374%	23%	66%	354%	45%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071700  
 START TIME: 17: 2:10 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.010 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -2.38E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.409E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.78E-05 (9.0E-06)	SCALING SPFC. HUMID. (Kg/Kg) -6.816E-05 (3.0E-05)
Z/L AT 10M 0.014 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.34E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.226E-02 (2.0E-02)
Z/L AT 10 METERS 0.010 (0.02)	SEN. HEAT FLUX (Watts/m2) -1.10E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.236E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 9.591E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.31E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.474E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.39E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.097 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF
61%	64%	11%	11%	104%	0%	15%	124%	5%	15%	100%	18%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905071730  
START TIME: 17:32:30 PST  
END TIME: 18:24:00 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1988  
DATA SAMPLING RATE (ALL CHANNELS): 7/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.159	5.218	5.608	5.436	4.739	0.689	4.565
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQ. FLUX	AC VOLTAGE	MANUAL FLAG	ZIRU REF.	SPARK A	SPARK B	VOLT REF B		
4.041	3.295	2.549	0.001	0.001	0.001	0.001	4.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	W1F CAL	W2F CAL	W1E CAL	W2E CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.13587	1421.13448	0.157	82	-0.008	-0.008	0.000	0.000	0.553	0.553

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEW	VOLT. REF. DEW	ZIRU REF. DEW	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).50V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	AC FREQ. FLUX	AC VOLTAGE
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(No. scans)	(VAC)
13.351	10.80	10.49	NO DATA	300.2	1010.91	9.61E-01	17.677	0.000	115.4
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR.	BAR. PRES. 2	SKY RAD.	BULK WT. TEMP.	AC FREQ. FLUX	AC VOLTAGE
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(No. scans)	(VAC)
13.442	10.21	10.48	NO DATA	0.45	1012.01	9.61E-01	17.677	0.000	115.4

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.531	14.713	14.893	9.571E-03	82.82	7.82E-03	12.655	11.204	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.632	14.804	14.894	9.520E-03	82.28	7.81E-03	12.641	11.186	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071730  
START TIME: 17:32:30 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1988  
DATA SAMPLING RATE (ALL CHANNELS): 7/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGFR, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPE (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 AT 6MH	MOMENTUM FLUX (N/m2) -1.54E-01	FRICTION VELOCITY (Meters/sec) 3.545E-01	GENERAL FORM. DNDZ 10N1-N2/10(Z1-Z2) (Z1*Z2)^(1/2)	GENERAL FORM. NNDZ 10N1-N2/10(Z1-Z2) (Z1*Z2)^(1/2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.77E-05	SCALING SPEC. HUMID. (Kg/m3) 6.33E-05	N-WIND SPEED (Meters) Z-HEIGHT (Meters) DWS/DZ = 6.60E-02	N-WIND SPEED (Meters) Z-HEIGHT (Meters) PS1-PS2 WS SLOPE = 1.4E-01
Z/L AT 6MH -0.009	LAT. HEAT FLUX (Watts/m2) 6.85E-01	SCALING POT. TEMP. (Kelvin) 6.390E-03	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) PS1-PS2 SH SLOPE = 6.4E-03
Z/L AT 10 METERS -0.007	SUN. HEAT FLUX (Watts/m2) 2.81E-00	ROUGHNESS LENGTH (Meters) 1.465E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -8.92E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS2 PTA SLOPE = 8.4E-01
Z/L AT Z1 -0.015	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.61E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.270E-03	N-TOTAL HEAT FLUX (Watts/m2) Z-HEIGHT (Meters) PS1-PS2	N-TOTAL HEAT FLUX (Watts/m2) Z-HEIGHT (Meters) PS1-PS2
Z/L AT Z2 -0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.48E-01			
MONIN-OBUKHOV LENGTH (Meters) -1.416E-03	ROUEN RATIO (no units) 0.041			
PS1 AT Z1 = 0.045099 PS1 AT Z2 = 0.023655 PS12 AT Z1 = 0.027958 PS12 AT Z2 = 0.014307				

## \* GENERAL CONSTANTS:

VON KARMAN (CONSTANT (No. units) <th>GRAVITATION (M/sec^2) <th>PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SIN. HEAT TRANSF. COEF <th>BULK MOISTURE TRANSF. COEF </th></th></th></th></th>	GRAVITATION (M/sec^2) <th>PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SIN. HEAT TRANSF. COEF <th>BULK MOISTURE TRANSF. COEF </th></th></th></th>	PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SIN. HEAT TRANSF. COEF <th>BULK MOISTURE TRANSF. COEF </th></th></th>	PROFILE TUR. SCHMIDT NUMBER <th>BULK SIN. HEAT TRANSF. COEF <th>BULK MOISTURE TRANSF. COEF </th></th>	BULK SIN. HEAT TRANSF. COEF <th>BULK MOISTURE TRANSF. COEF </th>	BULK MOISTURE TRANSF. COEF
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* REFERENCE VALUES

AIR DENSITY  
(Kg/m3)  
1.240

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = 1/2, DR1 = 3 Kg/Kg,  
PTK1-PTK2 = 1/2, DR2 = 0.008 Kel.

AIR SPECIFIC HEAT  
(Cal/Kg Kel)  
0.4186E-02

WATER LAT. HEAT CAP  
(Cal/Kg)  
1.8574E-02

## \* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905071730  
 START TIME: 17:32:30 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS

AIR TEMP (Celsius)	WIND SPEED (Meter/Sec)	D.W. POINT (Celsius)	TEMP. STRUC. (Kel x m <sup>2/3</sup> )	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.431	10.26	10.49	NO DATA	1011.91	13.877	-0.446	-0.348	0.916	1.014

HEIGHT (meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m <sup>3</sup> )	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel x m <sup>2/3</sup> )
10.00	13.509	14.293	14.891	9.57E-03	82.34	7.819E-03	12.661	15.376	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978)

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.014 AT 10M	MOMENTUM FLUX (N/m <sup>2</sup> ) -1.69E-01	FRICTION VELOCITY (Meters/sec) 3.719E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec <sup>2</sup> ) -1.383E-01	AIR DENSITY (Kg/m <sup>3</sup> ) 1.2243
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 3.25E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.127E-05	WITH ABS. HUMIDITY (Meter Kg/sec m <sup>3</sup> ) 3.245E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4169E 02
Z/L AT GMH -0.018	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 8.01E 01	SCALING POT. TEMP. (Kelvin) -1.424E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.296E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8972E 05
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 6.56E 00	ROUGHNESS LENGTH (Meters) 1.736E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.848
MONIN-OBUKHOV LENGTH (Meters) -7.105E 02	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -9.61E 01	DRAW. COEF. AT 10 METERS (Dimensionless) 1.309E-03		ABS. HUMID. AT WT LEVEL (Kg/m <sup>3</sup> ) 1.196E-02
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -9.40E 00			BAR. PRES. AT WT LEVEL (Millibar) 1013.11
	BOWEN RATIO (no units) 0.082			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
199%	199%	120%	171%	171%	6%	70%	341%	60%	110%	110%	80%	120%
273%	273%	46%	45%	201%	6%	21%	246%	23%	68%	224%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071730  
 START TIME: 17:32:30 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* DIFFERENCE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.016 (0.01) AT 10M	MOMENTUM FLUX (N/m <sup>2</sup> ) -1.65E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.671E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 3.15E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -6.847E-05 (3.0E-05)
Z/L AT GMH -0.013 (0.02)	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 7.77E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 8.978E-03 (2.0E-02)
Z/L AT 10 METERS -0.016 (0.02)	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.55E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.642E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 9.932E 02	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -9.61E 01 (2.0E+01)	DRAW. COEF. AT 10 METERS (Meters) 1.300E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.30E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.065 (0.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
10%	10%	5%	9%	47%	0%	29%	26%	3%	6%	21%	9%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071800  
START TIME: 18:25:00 PST  
END TIME: 18:32:50 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.116	5.182	5.672	5.409	4.729	0.132	4.651

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC FREQ. 1	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.214	3.879	2.539	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DEW CAL	DEW CAL	WIND CAL	WIND CAL	WIND CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.132268	1421.133129	0.157	78	0.008	0.059	0.000	0.593	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DIV.	Z-POT. REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.4	19.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
13.227	10.92	10.24	NO DATA	393.1	1010.76	-1.84E-01	13.851	286.452

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter ASL)	(Millibar)
15.518	10.25	10.27	NO DATA	0.51	1011.86

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	13.407	14.566	14.746	9.412E-03	82.08	7.691E-03	12.440	15.155	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.28	13.408	14.660	14.750	9.437E-03	81.75	7.705E-03	12.476	15.262	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071800  
START TIME: 18:25:00 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOR. JOY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 AT GMH	MOMENTUM FLUX (N/m2) -1.96E-01	FRICTION VELOCITY (Meters/sec) 3.996E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) * (1/(Z1-Z2) - 1/(Z2-Z1))$	GENERAL FORM: $N SLOPE = 1/(N1-N2) * (N1-N2) / (Z1-Z2)$
GEOMETRIC MEAN HEIGHT (Meter) GMH = $(Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec m2) 3.11E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.363E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 7.49E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 1.00E-00
Z/L AT GMH -0.007	LAT. HEAT FLUX (Watts/m2) 7.67E-01	SCALING POT. TEMP. (Kelvin) -6.363E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = -8.50E-03
Z/L AT 10 METERS -0.006	GEN. HEAT FLUX (Watts/m2) 3.15E-00	ROUGHNESS LENGTH (Meters) 2.231E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = -8.50E-03
Z/L AT Z1 -0.010	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.84E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.582E-03		N=LNT. TEMP. STRUCT. (K/m 2/3) Z=HEIGHT (M) Vert Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.005	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.16E-01			
MININ DRUKHOV LENGTH (Meters) -1.014E-03	ROSEN RATIO (no units) 0.841			
PS11 AT Z1 = 0.056259 PS11 AT Z2 = 0.018703 PS12 AT Z1 = 0.022820 PS12 AT Z2 = 0.011270				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SIN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2244
AIR SPECIFIC HEAT (J/Kel. / Kg Kel.) 2.41E+02
WATER LAT. HEAT VAP. (J/Kel. / Kg) 5.8981E+05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1 SH2 +/- .001-3 Kg/Kg.  
PTK1 PTK2 +/- .000R Kel.

## \* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905071800  
 START TIME: 18: 2:50 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
13.307	10.33	10.26	NO DATA	1011.77	13.851	-0.544	-0.446	0.798	0.896

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	13.405	14.649	14.747	9.434E-02	01.79	7.703E-03	12.472	15.259	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.016 AT 6MH	MOMENTUM FLUX (Nt/m2) -1.72E-01	FRICTION VELOCITY (Meters/sec) 3.743E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.481E-01	AIR DENSITY (Kg/m3) 1.2247
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.464E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.421E-05	AIR SPECIFIC HEAT (ITcal /Kg Kel) 2.4166E 02
Z/L AT 6MH -0.021	LAT. HEAT FLUX (Watts/m2) 8.45E 01	SCALING POT. TEMP. (Kelvin) -1.667E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.239E-03	WATER LAT. HEAT VAP (ITcal /Kg) 5.8979E 05
Z/L AT 10 METERS -0.016	SEN. HEAT FLUX (Watts/m2) 7.73E 00	ROUGHNESS LENGTH (Meters) 1.775E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.818
MONIN-OBUKHOV LENGTH (Meters) -6.145E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.84E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.312E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.194E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.38E 01			BAR. PRES. AT WT LEVEL (Millibar) 1012.97
	BOWEN RATIO (no units) 0.092			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
188%	188%	108%	164%	164%	9%	128%	377%	54%	110%	110%	74%	108%
242%	242%	46%	44%	170%	9%	36%	214%	23%	67%	193%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071800  
 START TIME: 18: 2:50 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.010 (0.02) AT 6MH	MOMENTUM FLUX (Nt/m2) -1.79E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.819E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.34E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.047E-05 (3.0E-05)
Z/L AT 6MH 0.013 (0.02)	LAT. HEAT FLUX (Watts/m2) 8.29E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.010E-02 (2.0E-02)
Z/L AT 10 METERS 0.010 (0.02)	SEN. HEAT FLUX (Watts/m2) 5.40E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.943E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -9.786E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.84E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.310E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.12E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.072 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
28%	27%	7%	5%	42%	0%	10%	32%	4%	8%	27%	12%	11%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905071830  
START TIME: 18:33: 0 PST  
END TIME: 19: 21:50 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
SKY RAD.	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DIR. POINT 1	DIR. POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.020	0.001	0.001	5.020	5.093	6.014	5.816	4.727	-0.074	4.792
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK ME. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
1.172	0.913	2.549	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WBFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
14.0	14.0	0.157	75	-0.008	-0.050	0.000	0.993	0.959

## \* ANALOG INSTRUMENT PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF.	DEV. ZERO	REF. DEV.	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. 0000)	(No. 0000)	(No. 0000)	(No. 0.005V)	(No. 0.005V)	(No. 0.002V)	(No. 0.005V)	(No. 1Hz)	(No. 1Hz)	(VAC)	(Hz)
0	0	100	0	0	0	0	0	0	115.4	59.91

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DIR. POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK ME. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meters/sec)	(Kelvin-2/3)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.995	11.58	9.06	NO DATA	307.9	1010.74	1.04E 01	13.810	286.198
AIR TEMP. 2	WIND SPEED 2	DIR. POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meters/sec)	(Kelvin-2/3)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
13.070	10.91	9.73	NO DATA	0.55	1011.83			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
10.35	13.165	14.273	14.453	9.063E-03	80.23	7.398E-03	11.969	14.918	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.09	13.180	14.384	14.474	9.113E-03	80.06	7.433E-03	12.038	15.036	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905071830  
START TIME: 18:33: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.010 AT 10M	MOMENTUM FLUX (N1/m2) -2.00E-01	FRICITION VELOCITY (Meters/sec) 4.042E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(1+ln(Z1/Z2))] * (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(lnZ1-PS1)-(lnZ2-PS1)] / [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) 10M*(Z1+Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 3.19E-05	SCALING SPEC. HUMID. (Kg/m3) 6.435E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DN/DZ = 7.44E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 9.70E-01
Z/L AT 10M 0.013	LAT. HEAT FLUX (Watts/m2) 7.67E 01	SCALING POT. TEMP. (Kelvin) 1.137E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.40E 03
Z/L AT 10 METERS -0.010	SEN. HEAT FLUX (Watts/m2) 5.70E 00	ROUGHNESS LENGTH (Meters) 2.323E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.58E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -4.75E 01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.04E 01	DRAO. COEF. AT 10 METERS (Dimensionless) 1.47E 05		N=LnTEMP. STRUCT. (K-m-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.48E 01			
MINI-MORPHOLOGY LENGTH (Meters) -1.026E 03	MINI RATIO (no units) 0.072			
PS11 AT Z1 = 0.062113 PS11 AT Z2 = 0.032310 PS12 AT Z1 = 0.030020 PS12 AT Z2 = 0.019599				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7952	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHL SLOPE = 2.00E-03 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2256

AIR SPECIFIC HEAT  
(J/cal./Kg. Kel.)  
2.4160E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.8994E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905071830  
 START TIME: 18:33: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	U.POT-WT TEMP. (Kelvin)
13.077	10.99	9.73	NO DATA	1011.74	13.810	-0.733	-0.635	0.560	0.658

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.175	14.370	14.468	9.107E-03	80.08	7.429E-03	12.030	15.022	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.018 AT GMH	MOMENTUM FLUX (Nt/m2) -2.01E-01	FRICTION VELOCITY (Meters/sec) 4.047E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.638E-01	AIR DENSITY (Kg/m3) 1.2259
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.07E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.205E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.070E-05	AIR SPECIFIC HEAT (JCal./Kg Kel.) 2.4160E 02
Z/L AT GMH -0.023	LAT. HEAT FLUX (Watts/m2) 1.01E 02	SCALING POT. TEMP. (Kelvin) -2.080E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.419E-03	WATER LAT. HEAT VAP. (JCal./Kg Kel.) 5.8992E 05
Z/L AT 10 METERS -0.017	SEN. HEAT FLUX (Watts/m2) 1.04E 01	ROUGHNESS LENGTH (Meter) 2.332E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.776
MONIN-OBUKHOV LENGTH (Meters) -5.750E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.04E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.355E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.21E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.94
	BOWEN RATIO (no units) 0.104			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
151%	151%	110%	163%	120%	12%	136%	283%	55%	108%	65%	75%	110%
209%	209%	46%	42%	137%	17%	37%	179%	23%	65%	160%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071830  
 START TIME: 18:33: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.013 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) 2.01E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.045E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.87E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.53E-05 [3.0E-05]
Z/L AT GMH -0.017 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.60E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.46E-02 [2.0E-02]
Z/L AT 10 METERS -0.013 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.91E 00 [3.0E+00]	ROUGHNESS LENGTH (Meter) 2.328E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.719E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.04E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.37E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.14E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.092 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
20%	19%	0%	13%	30%	0%	13%	18%	0%	12%	26%	0%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905071900  
START TIME: 19: 3: 0 PST  
END TIME: 19:33:10 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL.T. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DFW POINT 1	DFW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.992	5.664	5.770	5.600	4.742	-0.103	4.850
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK MT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRU REF.	SPARE A	SPARE B	VOL.T. REF. B		
4.155	3.974	2.540	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP/FCAL	DP/FCAL	W/FCAL	WS/FCL	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PAITH(Meters)	(Volts)	(Volts)	(Millibar)	(Coeff.)	(Coeff.)
1411 128018	1421 129099	0.183	72	-0.908	-0.050	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL.T. REF. DEV	VOL.T. REF. DEV	ZFRU REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.92

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK MT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.902	11.10	9.50	NO DATA	310.2	1010.97	1.43E 01	13.793	286.016
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.910	10.44	9.56	NO DATA	0.54	1012.06			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.982	14.074	14.254	8.973E-03	80.33	7.318E-03	11.842	14.743	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	13.110	14.168	14.278	9.015E-03	80.07	7.347E-03	11.902	14.863	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905071900  
START TIME: 19: 3: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -2.03E-01	FRICTION VELOCITY (Meters/sec) 4.071E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1+Z2)/1/2]	GENERAL FORM: 'N' SLOPE = [(Ln Z1 - PSI1) - (Ln Z2 - PSI2)] / (N1 - N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/1/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 3.24E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.483E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 7.41E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 9.82E-01
Z/L AT GMH -0.016	LAT. HEAT FLUX (Watts/m2) 0.00E 01	SCALING POT. TEMP. (Kelvin) -1.487E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.34E 03
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 7.51E 00	ROUGHNESS LENGTH (Meters) 2.381E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.05E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.64E 01
Z/L AT Z2 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.587E-05	N=Ln TEMP. STRUCT. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA	
MONIN-OBUKHOF LENGTH (Meters) -7.887E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.02E 02			
PSI1 AT Z1 = 0.079106 PSI1 AT Z2 = 0.041540 PSI2 AT Z1 = 0.048659 PSI2 AT Z2 = 0.025269	BOWEN RATIO (no units) 0.094			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001 3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2267
AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4158E 02
WATER LAT. HEAT VAP. (J/cal./Kg) 5.9004E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905071900  
 START TIME: 19: 3: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.897	10.52	9.55	NO DATA	1011.97	13.793	-6.895	-0.798	0.381	0.479

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.995	14.174	14.272	9.010E-03	80.10	7.343E-03	11.895	14.849	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.024 AT GMH	MOMENTUM FLUX (Nt/m2) -1.80E-01	FRICTION VELOCITY (Meters/sec) 3.827E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.464E-01	AIR DENSITY (Kg/m3) 1.2270
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.01E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.550E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.014E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4159E 02
Z/L AT GMH -0.031	LAT. HEAT FLUX (Watts/m2) 9.92E 01	SCALING POT. TEMP. (Kelvin) -2.540E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.721E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9002E 05
Z/L AT 10 METERS -0.024	SEN. HEAT FLUX (Watts/m2) 1.21E 01	ROUGHNESS LENGTH (Meters) 1.918E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.762
MONIN-OBUKHOV LENGTH (Meters) -4.208E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.324E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.17
	BOWEN RATIO (no units) 0.122			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
134%	134%	105%	160%	104%	10%	126%	263%	53%	107%	51%	73%	105%
193%	193%	46%	42%	121%	10%	35%	162%	23%	65%	144%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071900  
 START TIME: 19: 3: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.87E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.901E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.85E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.771E-05 (3.0E-05)
Z/L AT GMH -0.022 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.52E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.762E-02 (2.0E-02)
Z/L AT 10 METERS -0.017 (0.02)	SEN. HEAT FLUX (Watts/m2) 9.61E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.090E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -5.803E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.39E 03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.20E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.111 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
30%	20%	7%	12%	24%	0%	11%	13%	3%	14%	29%	11%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905071930  
START TIME: 17:33:20 PST  
END TIME: 20:33:30 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. 1. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.995	5.067	5.603	5.416	4.756	-0.103	4.805
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQ. VOLTAGE	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.135	3.683	2.541	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1/F CAL	DP2/F CAL	W1/F CAL	WS1 EC	WS2 EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128818	1421 129877	0.157	78	-0.008	-9.050	0.990	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.4	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.882	10.79	9.52	NO DATA	380.4	1011.18	1.44E 01	13.774	286.095
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.988	10.17	9.58	NO DATA	0.51	1012.27			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.062	14.156	14.335	8.981E-03	79.98	7.325E-03	11.855	14.823	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.078	14.267	14.358	9.025E-03	79.76	7.355E-03	11.918	14.942	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905071930  
START TIME: 17:33:20 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STARTILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.013 AT GMM	MOMENTUM FLUX (Nt/m2) -1.77E-01	FRICTION VELOCITY (Meters/sec) 3.799E-01	GENERAL FORM: DN/DZ = ((N1-N2)/(Ln(Z1/Z2)) * (Z1*Z2)^(1/2))	GENERAL FORM: N'SLOPE = ((LnZ1-PSI1)-(LnZ2-PSI2))/( [N1-N2])
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.02E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.487E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.90E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.05E 00
Z/L AT GMM -0.017	LAT. HEAT FLUX (Watts/m2) 7.47E 01	SCALING POT. TEMP. (Kelvin) -1.320E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.33E 03
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 6.22E 00	ROUGHNESS LENGTH (Meters) 1.870E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.82E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -4.89E 01
Z/L AT Z1 -0.074	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.468E-03		N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.53E 01			
MONIN-OBUKHOV LENGTH (Meters) -7.731E 02	ROMAN RATIO (no units) 0.083			
PSI1 AT Z1 = 0.080564 PSI1 AT Z2 = 0.042339 PSI2 AT Z1 = 0.049575 PSI2 AT Z2 = 0.025761				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (J/cal./Kg Kel.)	WATER LAT. HEAT VAP. (J/cal./Kg)
1.2266	2.4159E 02	5.9008E 05

RUN NUMBER: 7905071930  
 START TIME: 17:33:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.975	10.25	9.57	NO DATA	1012.18	13.774	-0.799	-0.701	0.480	0.578

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	13.073	14.254	14.352	9.020E-03	79.78	7.352E-03	11.911	14.928	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.024 AT 10M	MOMENTUM FLUX (Nt/m2) -1.68E-01	FRICTION VELOCITY (Meters/sec) 3.704E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.372E-01	AIR DENSITY (Kg/m3) 1.2269
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.88E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.546E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.884E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4159E 02
Z/L AT 10M -0.030	LAT. HEAT FLUX (Watts/m2) 9.59E 01	SCALING POT. TEMP. (Kelvin) -2.324E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.607E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.8998E 05
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 1.711E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.746
MONIN-OBUKHOV LENGTH (Meters) -4.312E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.306E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.21E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.38
	BOWEN RATIO (no units) 0.111			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
144%	144%	110%	163%	112%	10%	128%	275%	55%	108%	57%	75%	110%
201%	201%	46%	42%	129%	10%	35%	171%	23%	65%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905071930  
 START TIME: 17:33:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.017 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.71E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.732E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.71E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.722E-05 [3.0E-05]
Z/L AT 10M -0.022 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.16E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.593E-02 [2.0E-02]
Z/L AT 10 METERS -0.017 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.29E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.769E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -5.810E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.349E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.15E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.101 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
28%	26%	3%	13%	27%	0%	13%	14%	1%	14%	28%	5%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905072000  
START TIME: 20:34:00 PST  
END TIME: 20:33:50 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.993	5.067	6.003	5.783	4.766	-0.103	4.828

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.131	3.748	2.538	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND 1 AND	DP1FCAL	DP2FCAL	WTFCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.129759	1421.130292	0.157	R2	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA NAME	VOL. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.4	59.75

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.926	11.56	9.51	NO DATA	309.1	1011.32	1.44E 01	13.770	286.13H

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
13.029	10.85	9.5H	NO DATA	0.44	1012.42

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.10a	14.199	14.379	8.975E-03	79.69	7.320E-03	11.849	14.868	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.119	14.309	14.399	9.024E-03	79.54	7.355E-03	11.919	14.985	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905072000  
START TIME: 20:34:00 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GHM	MOMENTUM FLUX (Nt/m2) -2.23E-01	FRICTION VELOCITY (Meters/sec) 4.260E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Z1-Z2)] * [(Z1+Z2)/2]$	GENERAL FORM: $N'SLOPE = [(\ln Z1 - \ln Z2) - (\ln Z1 - \ln Z2)] / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meters) $GHM = (Z1+Z2)/2$ 12.97	HUMIDITY FLUX (Kg/sec m2) 3.35E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.413E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 7.89E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 9.39E-01
Z/L AT GHM -0.011	LAT. HEAT FLUX (Watts/m2) 8.21E 01	SCALING POT. TEMP. (Kelvin) -1.094E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.43E 03
Z/L AT Z1 -0.015	SUN. HEAT FLUX (Watts/m2) 5.78E 00	ROUGHNESS LENGTH (Meters) 2.785E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.52E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -4.94E 01
Z/L AT Z2 -0.008	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.591E-03		N=LNTMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-BUKHOV LENGTH (Meters) -1.188E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.03E 02			
PSI1 AT Z1= 0.054167 PSI1 AT Z2= 0.028049 PSI2 AT Z1= 0.033077 PSI2 AT Z2= 0.016989	BOWEN RATIO (no units) 0.070			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by interpolation of:

SHI-SH2= 47.0 DRF-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2266

AIR SPECIFIC HEAT  
(J/cal /Kg Kel.)  
2.4150E 02

WATER LAT. HEAT VAP  
(J/cal /Kg)  
5.8497E 05



RUN NUMBER: 7905072000  
 START TIME: 20: 3:40 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT. WT TEMP (Kelvin)	VIR. WT TEMP (Kelvin)	V. POT. WT TEMP (Kelvin)
13.017	10.94	9.57	NO DATA	1012.32	13.770	-0.753	-0.655	0.526	0.624

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	KEF. INDEX (Kelvin-M-2/3)
10.00	13.115	14.296	14.394	9.019E-03	79.56	7.351E-03	11.911	14.972	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 AT 10M	MOMENTUM FLUX (Nt/m2) -1.98E-01	FRICTION VELOCITY (Meters/sec) 4.021E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.617E-01	AIR DENSITY (Kg/m3) 1.2269
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.14E-05	SCALING SPEC. HUMID (Kg/Kg) -8.401E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.144E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4159E 02
Z/L AT 10M -0.024	LAT. HEAT FLUX (Watts/m2) 1.02E 02	SCALING POT. TEMP. (Kelvin) -2.136E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.589E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.8995E 05
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 1.07E 01	ROUGHNESS LENGTH (Meters) 2.281E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.744
MONIN-OBUKHOV LENGTH (Meters) -5.529E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.352E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.27E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.52
	BOWEN RATIO (no units) 0.104			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
147%	147%	104%	160%	119%	10%	129%	278%	52%	108%	66%	72%	104%
206%	206%	46%	42%	134%	10%	36%	176%	23%	65%	157%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072000  
 START TIME: 20: 3:40 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.013 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -2.06E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.094E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.98E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.653E-05 [3.0E-05]
Z/L AT 10M -0.016 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.83E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.403E-02 [2.0E-02]
Z/L AT 10 METERS -0.012 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.07E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.469E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -8.034E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.43E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.22E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.091 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	25%	6%	12%	30%	6%	12%	19%	3%	13%	28%	11%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 2905072030  
START TIME: 20:34: 0 PST  
END TIME: 21: 4:10 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.000	6.000	0.001	4.979	5.055	5.845	5.647	4.789	-0.103	4.836
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.114	5.761	0.000	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DIPICAL	DIPICAL	WIRFLAT	WSIC	WSIC
WIND DIR.	WIND TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.19550	1401.19550	0.152	89	-0.908	-0.850	0.000	0.993	0.959

## \* LISTED AVERAGING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

ANALOG FLAG	ENGINE COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)	(No. 0000)
0	0	100	0	0	0	0	0	115.4	59.76

## \* TWO-LEVEL MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATK. TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meters/sec)	(Celsius)	(Kx10m-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
10.000	11.000	9.400	NO DATA	399.4	1011.69	1.44E 01	13.764	286.167
ATK. TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meters/sec)	(Celsius)	(Kx10m-2/3)	(Meter MSL)	(Millibar)			
10.000	10.000	9.400	NO DATA	0.34	1012.79			

## \* TWO-LEVEL MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kx10m-2/3)
0.035	15.135	14.200	14.462	8.927E-03	79.10	7.279E-03	11.788	14.902	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kx10m-2/3)
5.229	15.149	14.333	14.423	8.984E-03	79.03	7.322E-03	11.869	15.020	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 2905072030  
START TIME: 20:34: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stability, -Unstability) 0.010 AT 0MH	MOMENTUM FLUX (Nt/m2) -1.93E-01	FRICTION VELOCITY (Meters/sec) 3.968E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(1+N1Z1/22)] * (Z1+Z2)/(1+Z2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)] / (N1-N2)
GRAD. TRIL. MEAN HEIGHT (Meters) 0MH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.13E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.436E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 7.30E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.01E 00
Z/L AT 0MH 0.013	LAT. HEAT FLUX (Watts/m2) 7.74E 01	SCALING POT. TEMP. (Kelvin) -1.100E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.40E 03
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 5.42E 00	ROUGHNESS LENGTH (Meters) 7.178E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.52E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -4.91E 01
Z/L AT Z1 -0.013	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.463E 03		N=LnTEMP. STRUC. (Kx10m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.72E 01			
MININ. DECKLOW LENGTH (Meters) -1.021E 03	BOWEN RATIO (no units) 0.070			
PSI1 AT Z1 = 0.662355 PSI1 AT Z2 = 0.32448 PSI2 AT Z1 = 0.331171 PSI2 AT Z2 = 0.019676				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units)	GRAVITATION ACCELERATION (m/sec 2)	PRANDTL NUMBER	SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7900	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI 542 Z/L 0.081 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2220
AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.41E 02
WATER LAT. HEAT VAP. (J/cal./Kg) 5.8996E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905072030  
 START TIME: 06:34: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	V. R-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
13.046	10.68	9.50	NO DATA	1012.69	13.764	-0.717	-0.619	0.556	0.654

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.144	14.320	14.418	8.979E-03	79.04	7.317E-03	11.860	15.006	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.019 AT 10M	MOMENTUM FLUX (Nt/m2) -1.87E-01	FRICTION VELOCITY (Meters/sec) 3.902E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.522E-01	AIR DENSITY (Kg/m3) 1.2272
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.10E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.567E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.102E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4150E-02
Z/L AT GMH -0.024	LAT. HEAT FLUX (Watts/m2) 1.01E-02	SCALING POT. TEMP. (Kelvin) -2.072E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.084E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.8994E-05
Z/L AT 10 METERS -0.019	SEN. HEAT FLUX (Watts/m2) 1.00E-01	ROUGHNESS LENGTH (Meters) 2.053E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.743
MONIN-OBUKHOV LENGTH (Meters) -5.367E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.335E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E-02			BAR. PWLS. AT WT LEVEL (Millibar) 1013.89
	BOWEN RATIO (no units) 0.099			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-"

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
152%	152%	110%	163%	121%	10%	130%	284%	55%	108%	67%	75%	110%
211%	211%	46%	42%	139%	10%	35%	180%	23%	65%	16%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072030  
 START TIME: 06:34: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( )

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.014 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -1.89E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.921E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.90E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.769E-05 (3.0E-05)
Z/L AT GMH 0.018 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.64E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.383E-02 (2.0E-02)
Z/L AT 10 METERS 0.013 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.57E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.098E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -7.410E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.360E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.20E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.088 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-"

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
25%	22%	2%	14%	31%	0%	14%	17%	1%	14%	26%	3%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905072100  
START TIME: 21: 4:20 PST  
END TIME: 21:34:30 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.920	5.061	6.137	5.840	4.800	-0.163	4.959

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.122	3.887	2.534	0.001	0.001	0.001	0.001	6.295

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND 1 AND	DP1 CAL	DP2 CAL	WTFFCAL	WTFFC	WTFFC	WTFFC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 128552	1421 129624	0.183	93	-0.008	-0.050	0.000	0.942	0.942	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .005V)	(No. .15V)	(No. 11Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY RAD	BULK WT TEMP	AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.855	11.80	9.07	NO DATA	313.6	1011.65	1.44E-01	13.761	12.855

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)
12.962	10.88	9.19	NO DATA	0.23	1012.95

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	V. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	13.035	14.091	14.271	8.721E-03	77.74	7.182E-03	11.512	14.80	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	V. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	13.053	14.209	14.299	8.797E-03	77.82	7.164E-03	11.616	14.908	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905072100  
START TIME: 21: 4:20 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGBER, 1973):

PROPERTY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, -DECR)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 AT GMM	MOMENTUM FLUX (Nt/m2) -3.76E-01	FRICTION VELOCITY (Meters/sec) 5.533E-01	GENERAL FORM DN/DZ (N1-N2)/((N1+Z1)^2) (21+22)/1/2	GENERAL FORM N SLOPE (LN(Z1-PS1) - (LN(Z2-PS1)))/(LN(N2)-LN(N1))
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.33E-05	SCALE IN SPEC. HUMID. (Kg/Kg) 6.377E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = 1.03E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 0.23E-01
Z/L AT GMM -0.008	LAT. HEAT FLUX (Watts/m2) 1.07E-02	SCALING POT. TEMP. (Kelvin) -1.396E-02	N-SPEC HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = 8.41E-03
Z/L AT 10 METERS -0.006	SKN. HEAT FLUX (Watts/m2) 9.59E-03	ROUGHNESS LENGTH (Meters) 6.739E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -1.95E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1=PS12 PT SLOPE = 3.81E-01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01	DRAW COEFF. AT 10 METERS (Dimensionless) -1.565E-03		N-TEMP. STRUCT. (K/M 2/3) Z-HEIGHT (M) Vert Axis PS1=NONH DT SLOPE=NO DATA
Z/L AT Z2 0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.31E-02			
MONIN-OBUKHOV LENGTH (Meters) -1.579E-03	ROBINSON RATIO (no units) 0.090			
PS11 AT Z1 = 0.041383 PS11 AT Z2 = 0.021722 PS12 AT Z1 = 0.025172 PS12 AT Z2 = 0.012856				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SKN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1-SH2 = +/- .001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2277

AIR SPECIFIC HEAT  
(J/Kg K)  
2.41E-02

WATER LAT. HEAT CAP  
(J/Kg K)  
5.9001E-05

RUN NUMBER: 7905072100  
 START TIME: 21: 4:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4 Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel./m-2/3)	BAR. PRES. (millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT WT TEMP. (Kelvin)	VIR WT TEMP. (Kelvin)	V POT WT TEMP. (Kelvin)
12.949	10.99	9.17	NO DATA	1012.86	13.761	-0.812	-0.714	0.433	0.541

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (millibars)	S. VAP. PRES. (millibars)	REF. INDEX (Kel./m-2/3)
10.00	13.047	14.194	14.292	8.789E-03	77.81	7.157E-03	11.604	14.914	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.019 AT GMH	MOMENTUM FLUX (Nt/m2) -2.01E-01	FRICTION VELOCITY (Meters/sec) 4.045E-01	WITH LONG. VELOCITY (Meters/sec2) -1.636E-01	AIR DENSITY (Kg/m3) 1.2280
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.50E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.056E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.495E-01	AIR SPECIFIC HEAT (J/cal /Kg kel.) 2.4150E-02
Z/L AT GMH -0.025	LAT. HEAT FLUX (Watts/m2) 1.11E-02	SCALING POT. TEMP. (Kelvin) -2.278E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.215E-03	WATER LAT. HEAT VAP (J/cal /Kg) 5.8999E-05
Z/L AT 10 METERS -0.019	SEN. HEAT FLUX (Watts/m2) 1.14E-01	ROUGHNESS LENGTH (Meters) 2.328E-04		VAP. PRES. AT WT LEVEL (millibar) 15.743
MONIN-OBUKHOV LENGTH (Meters) -5.245E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.355E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.37E-02			BAR. PRES. AT WT LEVEL (millibar) 1914.06
	PUMP RATIO (no units) 0.103			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE +/- 1.

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
114%	114%	80%	145%	91%	10%	120%	238%	40%	106%	52%	46%	80%
200%	200%	46%	41%	129%	10%	35%	169%	23%	64%	151%	44%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072100  
 START TIME: 21: 4:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4 Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.011 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.65E-01 (1.6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.592E-01 (1.6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.47E-05 (1.8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 8.049E-05 (1.3.0E-05)
Z/L AT GMH -0.014 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.10E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.620E-02 (2.0E-02)
Z/L AT 10 METERS -0.011 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.04E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.165E-04 (1.6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -9.125E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.270E-03 (1.4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.36E-02 (3.0E+01)	
	PUMP RATIO (no units) 0.097 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE +/- 1.

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF
34%	33%	14%	2%	9%	0%	3%	7%	12%	12%	20%	14%	2%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 790502130  
START TIME: 11:34:40 PST  
END TIME: 12:41:50 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

NO.01	NO.02	NO.03	NO.04	NO.05	NO.06	NO.07	NO.08	NO.09
WIND DIR. 1	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD. 1
0.265	0.000	0.001	4.942	5.012	5.769	5.550	4.796	4.822
NO.10	NO.11	NO.12	NO.13	NO.14	NO.15	NO.16	NO.17	
BULK WT. TEMP. 1	MEAN AIR TEMP. 1	AC. VOLTAGE 1	MANUAL FLAG 1	ZERO REF. 1	SPARE 1	SPARE 2	VOLT. REF. 1	
4.117	5.903	0.533	0.001	0.001	0.001	0.001	4.205	

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

NO.18	NO.19	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W3FCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH PATH (Meters)	HEIGHT/LENGTH PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
14.117961	14.01159020	0.157	105	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RANGE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(Ne. 2.000V)	B(Ne. 2.000V)	(No. 2.000V)	(No. 2.000V)	(No. 2.000V)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	BAR. PRES. 1	SKY RAD. 1	BULK WT. TEMP. 1	MEAN AIR TEMP. 1
(Celsius)	(Meters/sec)	(Celsius)	(Kelvin-273)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
14.118	11.90	7.29	NO DATA	308.9	1011.80	1.44E-01	13.756	266.007
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meters/sec)	(Celsius)	(Kelvin-273)	(Meter MSL)	(Millibar)			
12.862	16.42	9.28	NO DATA	0.10	1012.89			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(K/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
0.35	12.976	14.043	14.222	8.800E-03	78.74	7.170E-03	11.613	14.749	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(K/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
9.014	12.992	14.156	14.246	8.854E-03	78.62	7.209E-03	11.669	14.878	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 790502130  
START TIME: 11:34:40 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+SINCE WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.015 AT 10M	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.94E-01	FRICTION VELOCITY (Meters/sec) 3.547E-01	GENERAL FORM. DN/DZ = 1/(N1-N2) * 1/(1+(Z1/Z2)^2) (Z1+Z2)/(1+N2)	GENERAL FORM. N SLOPE = 1/(Z1-PS1) - 1/(Z2-PS1) (N1-N2)
GRAD. IRIG. MEAN HEIGHT (Meter) GRH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) -6.84E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.820E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DN/DZ = 6.40E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 1.14E-00
Z/L AT GRH 0.019	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 7.01E-01	SCALING POT. TEMP. (Kelvin) -1.326E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = 8.01E-03
Z/L AT Z1 0.024	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 5.84E-00	ROUGHNESS LENGTH (Meters) 1.469E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.81E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS13 PTR SLOPE = 4.01E-01
Z/L AT Z2 0.014	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.44E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.279E-03		N=TEMP. STRUCT. (K/M-273) Z=HEIGHT (M) Vert Axis PS1=NONE CTD SLOPE=NO DATA
MUNIN-DRUMKHOV LENGTH (Meters) 6.671E-02	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 9.03E-01			
PS11 AT Z1: 0.092649 PS11 AT Z2: 0.049628 PS12 AT Z1: 0.056923 PS12 AT Z2: 0.029626	ROMEN RATIO (no units) 0.083			

## \* GENERAL CONSTANTS:

SCH. KAPPA CONSTANT (No. units) 0.4	GRAVITATION (M/sec <sup>2</sup> ) 9.7972	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2279

## \* GENERAL NOTES:

Accuracy limitations exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1=SH2 = 672.00E-3 Kg/Kg

AIR SPECIFIC HEAT  
(J/Kg-Kelvin)  
2.415E-02

WATER LAT. HEAT VAP.  
(J/Kg-Kelvin)  
5.900E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 720507/0130  
 START TIME: 21:34:40 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 10.389	WIND SPEED (Meter/Sec) 10.49	DEW POINT (Celsius) 9.29	TEMP. STRUC. (Kelvin-2/3) NO DATA	BAR. PRES. (Millibar) 1012.80	BULK WT TEMP (Celsius) 13.756	AIR-WT TEMP (Kelvin) -0.867	POT-WT TEMP (Kelvin) -0.769	VIR-WT TEMP (Kelvin) 0.386	V.POT-WT TEMP (Kelvin) 0.484
10.389	POT. TEMP. (Celsius) 12.987	VIR. TEMP. (Celsius) 14.142	V.POT. TEMP. (Celsius) 14.240	ABS. HUMID. (Kg/m3) 8.840E-03	REL. HUMID. (Percent) 78.63	SPEC. HUMID. (Kg/Kg) 7.204E-03	VAP. PRES. (Millibars) 11.680	S. VAP. PRES. (Millibars) 14.854	REF. INDEX (Kelvin-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.024 AT 10M	MOMENTUM FLUX (Nt/m2) -1.79E-01	FRICTION VELOCITY (Meters/sec) 3.815E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.455E-01	AIR DENSITY (Kg/m3) 1.2281
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.21E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.977E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.206E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4156E 02
Z/L AT GMH -0.030	LAT. HEAT FLUX (Watts/m2) 1.04E 02	SCALING POT. TEMP. (Kelvin) -2.470E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.422E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9002E 05
Z/L AT 10 METERS 0.023	SEN. HEAT FLUX (Watts/m2) 1.17E 01	ROUGHNESS LENGTH (Meters) 1.898E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.737
MONIN-OBUKHOF LENGTH (Meters) -4.302E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.322E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.30E 02			BAR. PRES. AT WT LEVEL (Millibar) 1014.00
	BOWEN RATIO (no units) 0.113			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
154%	154%	121%	169%	118%	10%	132%	287%	61%	108%	58%	81%	121%
195%	195%	46%	41%	123%	10%	35%	164%	23%	64%	146%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 720507/0130  
 START TIME: 21:34:40 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.019 [0.001] AT GMH	MOMENTUM FLUX (Nt/m2) -1.72E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.741E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.94E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 8.063E-05 [3.0E-05]
Z/L AT GMH -0.024 [0.001]	LAT. HEAT FLUX (Watts/m2) 9.73E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.649E-02 [2.0E-02]
Z/L AT 10 METERS 0.019 [0.001]	SEN. HEAT FLUX (Watts/m2) 8.71E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.749E-04 [6.0E-05]
MONIN-OBUKHOF LENGTH (Meters) -5.359E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.299E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.07E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.102 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
20%	21%	0%	20%	34%	0%	19%	15%	4%	16%	31%	13%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905072200  
START TIME: 20: 5: 0 PST  
END TIME: 22: 35: 10 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.876	4.957	5.079	5.764	4.794	0.113	4.701
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.192	3.901	2.553	0.001	0.001	0.001	0.001	6.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	DOWNWIND	DIFF. CAL	DIFF. CAL	WINDY CAL	WINDY CAL	WINDY CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 128199	1421 129220	0.157	114	0.004	0.000	0.000	0.993	0.997

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	100	0	0	0	0	0	115.3	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin/2/3)
12.820	11.32	8.81	NO DATA	107.6	1011.75	1.44E-01	13.742	286.031
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Meter MSL)	(Millibar)			
12.922	10.71	8.97	NO DATA	-0.04	1012.85			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
18.35	13.000	14.034	14.213	8.568E-03	76.55	6.981E-03	11.367	14.771	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
9.20	13.012	14.146	14.236	8.641E-03	76.63	7.035E-03	11.408	14.807	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905072200  
START TIME: 20: 5: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 AT GMH	MOMENTUM FLUX (N/m <sup>2</sup> ) -1.70E-01	FRICITION VELOCITY (Meters/sec) 3.724E-01	GENERAL FORM: DN/DZ = [(N1-N2)/1+(Z1-Z2)/Z1] / [(Z1+Z2)/Z1]	GENERAL FORM: N1 SLOPE = [(LN Z1 - P1) - (LN Z2 - P2)] / [(N1-N2)]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 2.95E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.442E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = 6.85E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI2 WS SLOPE = 1.07E-00
Z/L AT GMH -0.013	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 7.28E-01	SCALING POT. TEMP. (Kelvin) -1.003E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -0.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -0.39E-03
Z/L AT 10 METERS -0.010	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.64E-00	ROUGHNESS LENGTH (Meters) 1.744E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -1.39E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -5.39E-01
Z/L AT Z1 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.44E-01	DRAW CODEL. AT 10 METERS (Dimensionless) 1.72E-03		N=LNTEMP. STRUCT. (K/m 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.009	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 9.18E-01			
MUNIN-ORUKHOV LENGTH (Meters) -9.450E-02	BOWEN RATIO (no. units) 0.044			
PSI1 AT Z1 = 0.064492 PSI1 AT Z2 = 0.433592 PSI2 AT Z1 = 0.039504 PSI2 AT Z2 = 0.020383				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec. 2)	TUR. PRANDTL NUMBER	PROFILE TIN. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.37E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- 0.01E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> ) 1.2278
AIR SPECIFIC HEAT (J/cal./Kg Kel.) 0.4151E-02
WATER LAT. HEAT VAP (J/cal./Kg) 5.9803E-05



RUN NUMBER: 7905072200  
 START TIME: 22: 5: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.910	10.78	8.91	NO DATA	1012.75	13.742	-0.832	-0.734	0.390	0.448

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	13.008	14.132	14.230	8.632E-03	76.62	7.029E-03	11.396	14.873	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.021 AT GMH	MOMENTUM FLUX (Nt/m2) -1.91E-01	FRICTION VELOCITY (Meters/sec) 3.948E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.559E-01	AIR DENSITY (Kg/m3) 1.2281
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.61E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.514E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.614E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4152E 02
Z/L AT GMH -0.022	LAT. HEAT FLUX (Watts/m2) 1.14E 02	SCALING POT. TEMP. (Kelvin) -2.351E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.283E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9001E 05
Z/L AT 10 METERS -0.021	SEN. HEAT FLUX (Watts/m2) 1.15E 01	ROUGHNESS LENGTH (Meters) 2.140E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.722
MONIN-OBUKHOV LENGTH (Meters) -4.841E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.341E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.187E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.40E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.95
	BOWEN RATIO (no units) 0.101			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
165%	165%	118%	168%	132%	10%	133%	300%	59%	109%	73%	79%	118%
198%	198%	46%	40%	126%	10%	34%	166%	23%	63%	149%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072200  
 START TIME: 22: 5: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 (0.021 AT GMH)	MOMENTUM FLUX (Nt/m2) -1.86E-01 (1.60E-02)	FRICTION VELOCITY (Meters/sec) 3.886E-01 (1.60E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.29E-05 (3.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.384E-05 (3.0E-05)
Z/L AT GMH -0.019 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.06E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.446E-02 (2.0E-02)
Z/L AT 10 METERS -0.015 (0.02)	SEN. HEAT FLUX (Watts/m2) 8.16E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.001E-04 (1.60E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.702E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 1.341E-03 (1.60E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.30E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.088 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
28%	26%	6%	23%	42%	0%	21%	22%	3%	19%	36%	10%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905072230  
START TIME: 22:35:20 PST  
END TIME: 23:53:00 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.866	4.949	5.685	5.499	4.789	-0.103	4.780

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE R	VOLT. REF. R
4.058	5.054	2.533	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.1004	1411.1007	0.157	122	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSE: PING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. > .005V)	R (No. > .005V)	(No. > .002V)	(No. > .5V)	(No. > 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.004	10.95	8.75	NO DATA	307.5	1011.69	1.44E 01	13.728	286.016

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.908	10.33	8.87	NO DATA	-0.17	1012.78

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.984	14.013	14.193	8.535E-03	76.34	6.954E-03	11.264	14.755	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.998	14.128	14.218	8.615E-03	76.46	7.013E-03	11.371	14.872	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905072230  
START TIME: 22:35:20 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
TRAID RICHARDSON NUMBER (+Stable, -Unstable) 0.011 AT GMM	MOMENTUM FLUX (N/m2) -1.77E-01	FRICTION VELOCITY (Meters/sec) 3.802E-01	GENERAL FORM: DN/DZ = [(N1-N2)/((ln(Z1/Z2)) <sup>2</sup> )]	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
HUMIDITY MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.91E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.455E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.97E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.05E 00
Z/L AT GMM 0.014	LAT. HEAT FLUX (Watts/m2) 7.44E 01	SCALING POT. TEMP. (Kelvin) -1.124E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.37E 03
Z/L AT 10 METERS -0.011	HEAT FLUX (W2) 0	ROUGHNESS LENGTH (Meters) 1.875E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.55E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -4.81E 01
Z/L AT Z1 -0.008	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.45E-03		
Z/L AT Z2 -0.010	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.41E 01			
MONIN-DEUKHOV LENGTH (Meters) -9.138E 02	BOWEN RATIO (no units) 0.071			N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1 = 0.069120 PSI1 AT Z2 = 0.036096 PSI2 AT Z1 = 0.040395 PSI2 AT Z2 = 0.021919				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2278

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4151E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9004E 05

RUN NUMBER: 7905072230  
 START TIME: 22:35:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT 10 METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.895	10.40	8.86	NO DATA	1012.69	13.728	-0.033	-0.735	0.386	0.484

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.993	14.114	14.212	8.604E-03	76.44	7.006E-3	11.358	14.858	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.024 AT GMH	MOMENTUM FLUX (Nt/m2) -1.75E-01	FRICTION VELOCITY (Meters/sec) 3.774E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.424E-01	AIR DENSITY (Kg/m3) 1.2281
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.48E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.656E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.476E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4151E-02
Z/L AT GMH -0.030	LAT. HEAT FLUX (Watts/m2) 1.11E-02	SCALING POT. TEMP. (Kelvin) -2.393E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.033E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9002E-05
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 1.12E-01	ROUGHNESS LENGTH (Meters) 1.827E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.707
MONIN-OBUKHOV LENGTH (Meters) -4.344E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.316E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.36E-02			BAR. PRES. AT WT LEVEL (Millibar) 1013.89
	BOWEN RATIO (no units) 0.101			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
153%	153%	112%	164%	121%	10%	130%	285%	56%	108%	66%	76%	112%
198%	198%	46%	40%	126%	10%	34%	166%	23%	63%	149%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072230  
 START TIME: 22:35:20 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.016 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.76E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.782E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.19E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.475E-05 (3.0E-05)
Z/L AT GMH -0.021 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.03E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.512E-02 (2.0E-02)
Z/L AT 10 METERS -0.016 (0.02)	SEN. HEAT FLUX (Watts/m2) 8.21E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.845E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -6.172E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.34E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.27E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.090 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
32%	38%	1%	20%	36%	0%	19%	17%	0%	20%	34%	1%	4%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905072300  
START TIME: 23: 5:40 PST  
END TIME: 23:35:50 PST  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.891	4.972	5.645	5.435	4.781	-0.103	4.818

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.071	3.897	2.533	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	DP:FCAL	DP:FCAL	DP:FCAL	DP:FCAL	DP:FCAL
1411 127687	1421 128776	0.157	130	-0.008	-0.050	0.000	0.993	0.999

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).50V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.90

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.769	10.87	8.90	NO DATA	308.8	1011.56	1.44E 01	13.712	285.983

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.878	10.21	9.01	NO DATA	-0.30	1012.65

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	U.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.949	13.990	14.170	8.620E-03	77.28	7.024E-03	11.375	14.719	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	U.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.968	14.108	14.199	8.692E-03	77.31	7.077E-03	11.474	14.841	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905072300  
START TIME: 23: 5:40 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.013 At GMH	MOMENTUM FLUX (Nt/m2) -2.05E-01	FRICTION VELOCITY (Meters/sec) 4.083E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[ln(Z1/Z2)]* (Z1+Z2)/1/21	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.25E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.492E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 7.41E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 9.80E-01
Z/L AT GMH -0.017	LAT. HEAT FLUX (Watts/m2) 8.04E 01	SCALING POT. TEMP. (Kelvin) -1.560E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.33E 03
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 7.91E 00	ROUGHNESS LENGTH (Meters) 2.405E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -2.14E-03	N=POT. TEMP. (kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.47E 01
Z/L AT Z1 -0.024	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.069E-03		N=LNTMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NDME CT2 SLOPE=NO DATA
Z/L AT Z2 -0.012	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.03E 02			
MUNIN-OBUKHOV LENGTH (Meters) -7.547E 02	BOWEN RATIO (no units) 0.098			
PSI1 AT Z1= 0.082343 PSI1 AT Z2= 0.943316 PSI2 AT Z1= 0.050695 PSI2 AT Z2= 0.076364				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2278

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4152E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9806E 05

RUN NUMBER: 7905072300  
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MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.864	10.29	8.99	NO DATA	1012.56	13.712	-0.847	-0.749	0.382	0.480

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin/2/3)
10.00	12.962	14.094	14.192	8.683E-03	77.31	7.071E-03	11.462	14.827	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.025 AT GMH	MOMENTUM FLUX (Nt/m2) -1.70E-01	FRICTION VELOCITY (Meters/sec) 3.722E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.386E-01	AIR DENSITY (Kg/m3) 1.2280
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.407E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.300E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.031	LAT. HEAT FLUX (Watts/m2) 1.06E 02	SCALING POT. TEMP. (Kelvin) -2.443E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 9.092E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9004E 05
Z/L AT 10 METERS -0.024	SEN. HEAT FLUX (Watts/m2) 1.13E 01	ROUGHNESS LENGTH (Meters) 1.741E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.688
MONIN-BUKHOV LENGTH (Meters) -4.141E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.309E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.185E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.32E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.76
	BOWEN RATIO (no units) 0.106			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
130%	130%	103%	159%	100%	10%	124%	259%	51%	107%	49%	71%	103%
197%	197%	46%	41%	125%	10%	34%	165%	23%	64%	148%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072300  
 START TIME: 23: 5:40 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.018 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.81E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.834E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.07E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.321E-05 [3.0E-05]
Z/L AT GMH -0.023 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.01E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.779E-02 [2.0E-02]
Z/L AT 10 METERS -0.018 [0.02]	SEN. HEAT FLUX (Watts/m2) 9.41E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.990E-04 [6.0E-05]
MONIN-BUKHOV LENGTH (Meters) -5.684E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.410E -03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26F 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.103 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
30%	28%	10%	15%	18%	0%	13%	4%	5%	18%	25%	17%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905072330  
START TIME: 23:36: 0 P  
END TIME: 0: 5:50 P  
START DATE: 7 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC)

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DW POINT 1	DW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.930	5.003	5.288	5.126	4.782	-0.103	4.884

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQ. 1	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
-0.048	5.889	2.533	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE)

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP/F CAL	DP/F CAL	W/F CAL	WSIEC	WSIEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.127094	1421.128673	0.183	138	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1Hz)	(V)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.709	12.18	9.13	NO DATA	311.1	1011.57	1.44E 01	13.689	285.973

AIR TEMP. 2	WIND SPEED 2	DW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.867	9.57	9.20	NO DATA	-0.40	1012.67

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
14.35	12.939	14.000	14.180	8.757E-03	78.55	7.136E-03	11.555	14.710	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.952	14.114	14.204	8.804E-03	78.36	7.167E-03	11.621	14.831	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 2905072330  
START TIME: 23:36: 0 PST  
START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 AT GHM	MOMENTUM FLUX (N/m2) -1.75E-01	FRICTION VELOCITY (Meters/sec.) 3.778E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1+Z2)/2]$	GENERAL FORM: $N'SLOPE = [Ln(Z1-PS1) - Ln(Z2-PS1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.02E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.517E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DWS/DZ = 6.82E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis $PS1=PS11$ WS SLOPE = 1.06E 00
Z/L AT GHM -0.019	LAT. HEAT FLUX (Watts/m2) 7.47E 01	SCALING POT. TEMP. (Kelvin) -1.486E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis $PS1=PS12$ SH SLOPE = -8.29E 03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m2) 6.97E 00	ROUGHNESS LENGTH (Meters) 1.835E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -2.03E-03$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis $PS1=PS12$ PTK SLOPE = -3.64E 01
Z/L AT Z1 -0.022	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.651E-03		N=LtTEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert. Axis $PS1=NONE$ CT2 SLOPE=NO DATA
Z/L AT Z2 -0.014	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.60E 01			
ADWIN DRINKHOV LENGTH (Meters) -6.759E 02	BOWEN RATIO (no units) 0.093			
PS11 AT Z1 = 0.090980 PS11 AT Z2 = 0.048045 PS12 AT Z1 = 0.056147 PS12 AT Z2 = 0.029309				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) <th>GRAVITATION ACCELERATION (M/sec 2) <th>PRANDTL NUMBER <th>PROF. SCHMIDT NUMBER <th>BULK SH. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec 2) <th>PRANDTL NUMBER <th>PROF. SCHMIDT NUMBER <th>BULK SH. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PRANDTL NUMBER <th>PROF. SCHMIDT NUMBER <th>BULK SH. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROF. SCHMIDT NUMBER <th>BULK SH. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SH. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.795V	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (Jcal./Kg Kel.)	WATER LAT. HEAT VAP. (Jcal./Kg)
1.2278	2.4154E 02	5.9007E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905072330  
 START TIME: 23:36: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.854	9.64	9.19	NO DATA	1012.57	13.689	-0.835	-0.737	0.411	0.509

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.952	14.100	14.198	8.799E-03	78.38	7.165E-03	11.614	14.817	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.030 AT GMH	MOMENTUM FLUX (Nt/m2) -1.45E-01	FRICTION VELOCITY (Meters/sec) 3.431E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.177E-01	AIR DENSITY (Kg/m3) 1.2280
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.86E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.167E-05	WITH ARS. HUMIDITY (Meter Kg/sec m3) 3.862E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4155E 02
Z/L AT GMH -0.038	LAT. HEAT FLUX (Watts/m2) 9.54E 01	SCALING POT. TEMP. (Kelvin) -2.487E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.532E-03	WATER LAT. HEAT VAP (Jcal./Kg) 5.9004E 05
Z/L AT 10 METERS -0.029	SEN. HEAT FLUX (Watts/m2) 1.96E 01	ROUGHNESS LENGTH (Meters) 1.305E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.665
MONIN-OBUKHOV LENGTH (Meters) -3.454E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.266E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.20E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.77
	BOWEN RATIO (no units) 0.111			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
134%	134%	105%	160%	104%	10%	125%	264%	53%	167%	51%	73%	105%
198%	198%	46%	41%	126%	10%	34%	167%	23%	64%	149%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905072330  
 START TIME: 23:36: 0 PST  
 START DATE: 7 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.021 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.54E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.536E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.69E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.175E-05 [3.0E-05]
Z/L AT GMH -0.027 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.12E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.742E-02 [2.0E-02]
Z/L AT 10 METERS -0.021 [0.02]	SEN. HEAT FLUX (Watts/m2) 8.61E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.582E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.874E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.32E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.15E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.104 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
37%	35%	11%	13%	21%	0%	12%	9%	5%	17%	28%	18%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905080000  
START TIME: 0: 6: 0 PST  
END TIME: 0:35:50 PST  
START DATE: 8 May 1977 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT.RFF.A 6.205	No.01 TEMP.STRUC.1 0.001	No.02 TEMP.STRUC.2 0.001	No.03 DEW POINT1 4.886	No.04 DEW POINT2 4.972	No.05 WIND SPEED1 5.176	No.06 WIND SPEED2 4.956	No.07 BAR.PRES.2 4.772	No.08 SKY RAD. -0.103	No.09 WIND DIR 4.916
No.10 BULK WT TEMP 4.024	No.11 AC FREQUENCY 3.891	No.12 AC VOLTAGE 2.533	No.13 MANUAL FLAG 0.001	No.14 ZERO RFF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT.RFF.B 6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 127291	No.2 AIR TEMP.2 1421 128324	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH(Meters) 143	DP1FCAL (Volts) -0.008	DP2FCAL (Volts) -0.050	W1BFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT.RFF.DEV A(No.) .005V 0	VOLT.RFF.DEV B(No.) .005V 0	ZERO REF.DEV (No.) .002V 0	AC VOLT.FLUX (No.) 5V 0	AC FREQ.FLUX (No.) 1Hz 0	AC VOLTAGE (VAC) 115.3	AC FREQUENCY (Hz) 59.89
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 12.729	WIND SPEED1 (Meter/sec) 9.96	DEW POINT1 (Celsius) 8.87	TEMP.STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg True) 312.2	BAR.PRES.1 (Millibar) 1011.42	SKY RAD. (Watt/m2) 1.44E-01	BULK WT TEMP (Celsius) 13.666	MEAN AIR TEMP (Kelvin) 285.941
AIR TEMP.2 (Celsius) 12.832	WIND SPEED2 (Meter/sec) 9.26	DEW POINT2 (Celsius) 9.01	TEMP.STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.48	BAR.PRES.2 (Millibar) 1012.52			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT.TEMP.1 (Celsius) 12.909	VIR.TEMP.1 (Celsius) 13.948	V.POT.TEMP.1 (Celsius) 14.128	ABS.HUMID.1 (Kg/m3) 8.605E-03	REL.HUMID.1 (Percent) 77.34	SPEC.HUMID.1 (Kg/Kg) 7.011E-03	VAP.PRES.1 (Millibar) 11.353	S.VAP.PRES.1 (Millibar) 14.679	REF.INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT.TEMP.2 (Celsius) 12.923	VIR.TEMP.2 (Celsius) 14.063	V.POT.TEMP.2 (Celsius) 14.153	ABS.HUMID.2 (Kg/m3) 8.693E-03	REL.HUMID.2 (Percent) 77.55	SPEC.HUMID.2 (Kg/Kg) 7.078E-03	VAP.PRES.2 (Millibar) 11.474	S.VAP.PRES.2 (Millibar) 14.795	REF.INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080000  
START TIME: 0: 6: 0 PST  
START DATE: 8 May 1977 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GMH	MOMENTUM FLUX (Nt/m2) -2.22E-01	FRICTION VELOCITY (Meters/sec) 4.253E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)] / [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.35E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.414E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.87E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 9.40E-01
Z/L AT GMH -0.011	LAT. HEAT FLUX (Watts/m2) 8.27E-01	SCALING POT. TEMP. (Kelvin) -1.100E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.43E-03
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 5.81E-00	ROUGHNESS LENGTH (Meters) 2.770E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.53F-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -4.91E-01
Z/L AT Z1 -0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.192E-03		N=LnTEMP.STRUC. (km-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE = NO DATA
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.03E-02			
MONIN-OBUKHNOV LENGTH (Meters) -1.176E-03	ROSEN RATIO (no units) 0.070			
PS11 AT Z1 = 0.054659 PS11 AT Z2 = 0.028312 PS12 AT Z1 = 0.033383 PS12 AT Z2 = 0.017150				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBR 0.74	PROFILE TUR. SCHMIDT NUMBR 0.74	BULK SEN HEAT TRANSF. COEF. 0.92F-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
---	--	--	--	---	---

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2278

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4152E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9009E-05



RUN NUMBER: 7905080000  
 START TIME: 0: 6: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.820	9.34	8.99	NO DATA	1012.42	13.686	-0.846	-0.748	0.384	0.482

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	12.918	14.049	14.147	8.683E-03	77.53	7.070E-03	11.459	14.781	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.034 AT GMM	MOMENTUM FLUX (Nt/m2) -1.34E-01	FRICTION VELOCITY (Meters/sec) 3.298E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.088E-01	AIR DENSITY (Kg/m3) 1.2281
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.86E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.535E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.862E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT GMM -0.042	LAT.HEAT FLUX (Watts/m2) 9.54E 01	SCALING POT.TEMP. (Kelvin) -2.554E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 8.425E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9006E 05
Z/L AT 10 METERS -0.032	SEN.HEAT FLUX (Watts/m2) 1.05F 01	ROUGHNESS LENGTH (Meters) 1.133E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.639
MONIN-OBUKHOV LENGTH (Meters) -3.108E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAG COEF.AT 10 METERS (Dimensionless) 1.247E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.20E 02			BAR.PRES.AT WT LEVEL (Millibar) 1013.62
	BOWEN RATIO (no units) 0.110			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
135%	135%	90%	152%	111%	10%	123%	263%	45%	107%	65%	65%	90%
197%	197%	46%	41%	125%	18%	34%	166%	23%	64%	148%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080000  
 START TIME: 0: 6: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+=UP,-=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.019 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -1.63E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.620E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.75E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) -8.370E-05 (3.0E-05)
Z/L AT GMM -0.024 (0.02)	LAT.HEAT FLUX (Watts/m2) 9.27E 01 (2.0E+01)	SCALING POT.TEMP. (Kelvin) -1.546E-02 (2.0E-02)
Z/L AT 10 METERS -0.018 (0.02)	SEN.HEAT FLUX (Watts/m2) 7.99E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.784E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -5.522E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 (2.0E+01)	DRAG COEF.AT 10 METERS (Meters) 1.537E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.16F 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.094 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
64%	60%	28%	8%	29%	8%	9%	21%	14%	19%	39%	47%	33%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080030  
START TIME: 0:36: 0 PST  
END TIME: 1: 6:10 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.984	4.960	5.136	4.966	4.750	-0.103	4.613
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.943	3.885	2.553	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1/FCL	DP2/FCL	WTH/FCL	WS1/FCL	WS2/FCL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.127500	1401.128551	0.157	146	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM MULTIPLE-READING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT.	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
12.750	9.90	8.96	NO DATA	331.9	1011.08	1.43E-01	13.646	285.963
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.855	9.34	8.94	NO DATA	-0.53	1012.18			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.930	13.968	14.148	8.594E-03	77.17	7.005E-03	11.339	14.694	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.945	14.060	14.170	8.648E-03	77.06	7.044E-03	11.414	14.812	NO DATA

## \* CONTINUED FLOW

RUN NUMBER: 7905080030  
START TIME: 0:36: 0 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 AT GRH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.44E-01	FRICTION VELOCITY (Meters/sec) 3.428E-01	GENERAL FORM DN/DZ: (N1-N2)/(Z1-Z2) -0.015	GENERAL FORM: N SLOPE: (N1-N2)/(Z1-Z2) -0.015
GOMMEYRIC MEAN HEIGHT (Meter) GRH=(Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 2.74E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.524E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DN/DZ = 6.18E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS12 WS SLOPE = 1.17E-00
Z/L AT GRH -0.020	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 6.79E-01	SCALING POT. TEMP. (Kelvin) -1.260E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 8.29E-03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 5.36E-00	ROUGHNESS LENGTH (Meters) 1.302E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.72E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -4.29E-01
Z/L AT Z1 -0.043	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.43E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.44E-03		
Z/L AT Z2 -0.014	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 8.75E-01			
MININ DRAGHVV LENGTH (Meters) -6.505E-02	BOWEN RATIO (No. units) 0.079			
PS11 AT Z1 = 0.093517 PS11 AT Z2 = 0.149423 PS12 AT Z1 = 0.057752 PS12 AT Z2 = 0.030180				

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT	GRAVITATION PROFILE CONSTANT	TUR. SCHMIDT NUMBER	BULK SIGN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7979	0.74	0.94E-03	1.32E-03

## \* GENERAL NOTE:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation performed by insertion of:

SHI SLOPE = 8.29E-03 Kg/Kg

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2273

AIR SPECIFIC HEAT  
(J/cal /kg kel.)  
2.4152E-02

WATER LAT. HEAT VAP  
(J/cal /kg)  
5.4007E-04

RUN NUMBER: 7905080040  
 START TIME: 0:36:00 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.842	9.41	8.93	NO DATA	1012.08	13.646	-0.803	-0.705	0.421	0.519

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.940	14.066	14.164	0.641E-03	77.08	7.039E-03	11.496	14.798	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.031 AT 10M	MOMENTUM FLUX (Nt/m2) -1.36E-01	FRICTION VELOCITY (Meters/sec) 3.328E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.107E-01	AIR DENSITY (Kg/m3) 1.2276
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.92E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.591E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.918E-05	AIR SPECIFIC HEAT (ITcal./Kg) 2.4152E 02
Z/L AT GMH -0.039	LAT. HEAT FLUX (Watts/m2) 9.68E 01	SCALING POT. TEMP. (Kelvin) -2.435E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.104E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9005E 05
Z/L AT 10 METERS -0.030	SEN. HEAT FLUX (Watts/m2) 1.01E 01	ROUGHNESS LENGTH (Meters) 1.170E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.613
MONIN-OBUKHOV LENGTH (Meters) -3.319E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.251E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.21E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.28
	BOWEN RATIO (no units) 0.104			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
149%	149%	114%	165%	117%	10%	128%	282%	57%	108%	60%	77%	114%
201%	201%	46%	41%	129%	10%	34%	170%	23%	64%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080030  
 START TIME: 0:36:00 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.38E-01 [1.6E-02]	FRICTION VELOCITY (Meters/sec) 3.357E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.69E-05 [1.6E-06]	SCALING SPEC. HUMID. (Kg/Kg) 8.45E-05 [3.0E-05]
Z/L AT GMH 0.028 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.11E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.592E-02 [2.0E-02]
Z/L AT 10 METERS 0.022 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.59E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.217E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.632E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 1.30E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.14E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.095 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED (COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER)). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
36%	7%	3%	19%	31%	0%	17%	14%	2%	19%	37%	6%	8%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080100  
START TIME: 11: 6:20 PST  
END TIME: 11:36:30 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.910	4.977	5.288	5.140	4.724	-0.103	4.519
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.977	3.889	2.534	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FC	W3FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff)	(Coeff)
1411 127603	1421 128652	0.125	92	-0.008	-0.050	0.000	0.955	0.960

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.760	10.21	9.01	NO DATA	299.3	1010.69	1.43E 01	13.619	285.973
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.865	9.76	9.04	NO DATA	-0.55	1011.78			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.940	13.991	14.171	8.681E-03	77.93	7.079E-03	11.454	14.698	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.955	14.099	14.189	8.705E-03	77.55	7.094E-03	11.490	14.816	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080100  
START TIME: 11: 6:20 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.024 AT GMH	MOMENTUM FLUX (Nt/m2) -9.81E-02	FRICTION VELOCITY (Meters/sec) 2.827E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(Ln(Z1/Z2))$ (Z1=Z2) 1/2	GENERAL FORM: $N1 SLOPE = (Ln Z1 - PSI1) - (Ln Z2 - PSI2) / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.641E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 4.95E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.41E 00
Z/L AT GMH -0.030	LAT. HEAT FLUX (Watts/m2) 5.69E 01	SCALING POT. TEMP. (Kelvin) -1.270E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.14E 03
Z/L AT 10 METERS -0.023	SWN. HEAT FLUX (Watts/m2) 4.45E 00	ROUGHNESS LENGTH (Meters) 6.453E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.70E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -4.26E 01
Z/L AT Z1 -0.042	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEF. AT 10 METERS (Dimensionless) 9.1861 04		N=LTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NDNE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.021	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.57E 01			
MONIN-OBUKHOV LENGTH (Meters) -4.337E 02	BOWEN RATIO (no units) 0.078			
PSI1 AT Z1= 0.134473 PSI1 AT Z2= 0.072700 PSI2 AT Z1= 0.083920 PSI2 AT Z2= 0.044637				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SW. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2267

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./kg Kel.)  
2.4153E 02

WATER LAT. HEAT VAP  
(J/cal./kg)  
5.9807E 06

RUN NUMBER: 7905080100  
 START TIME: 11: 6:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

TEMP.	WIND SPEED	DEW POINT	TEMP. STRUCT.	BAR. PRES.	BULK WT TEMP	AIR-WT TEMP	POT-WT TEMP	VIR-WT TEMP	V. POT-WT TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Millibar)	(Celsius)	(Kelvin)	(Kelvin)	(Kelvin)	(Kelvin)
12.853	9.82	9.04	NO DATA	1011.69	13.619	-0.767	-0.669	0.467	0.565

HEIGHT	POT. TEMP.	VIR. TEMP.	V. POT. TEMP.	ABS. HUMID.	REL. HUMID.	SPEC. HUMID.	V. PRES.	S. VAP. PRES.	REF. INDEX
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibars)	(Millibars)	(Kelvin 2/3)
10.00	12.951	14.086	14.184	8.702E-03	77.60	7.092E-03	11.486	14.802	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.026 AT GMH	MOMENTUM FLUX (Nt/m2) -1.51E-01	FRICTION VELOCITY (Meters/sec) 3.510E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.232E-01	AIR DENSITY (Kg/m3) 1.2270
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.98E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.240E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.979E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.033	LAT. HEAT FLUX (Watts/m2) 9.83E 01	SCALING POT. TEMP. (Kelvin) -2.291E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.040E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9005E 05
Z/L AT 10 METERS -0.025	SEN. HEAT FLUX (Watts/m2) 9.98E 00	ROUGHNESS LENGTH (Meters) 1.414E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.581
MONIN-OBUKHOV LENGTH (Meters) -3.924E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.278E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.23E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.89
	BOWEN RATIO (no units) 0.101			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
178%	178%	146%	183%	136%	10%	138%	319%	73%	110%	63%	93%	146%
205%	205%	46%	41%	133%	10%	35%	174%	73%	64%	15.62	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080100  
 START TIME: 11: 6:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

S ARTIITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.38E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.346E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.67E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.28E-05 [3.0E-05]
Z/L AT GMH -0.031 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.07E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.562E-02 [2.0E-02]
Z/L AT 10 METERS -0.024 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.25E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.172E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.135E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.241E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.17E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.093 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
5%	5%	22%	27%	38%	0%	24%	13%	11%	16%	28%	35%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080130  
START TIME: 1:36:40 PST  
END TIME: 2:06:50 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.601	0.001	4.838	4.923	5.403	5.195	4.696	-0.103	4.601
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZIRK. REF.	SPARE A	SPARE B	VOLT. REF. B		
3.965	5.885	2.534	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WT1FCAL	WS1FC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.177476	1421.129335	0.157	146	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERRR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZIRK. REF. DEV	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. x .005V)	B (No. x .005V)	C (No. x .002V)	(No. x 5V)	(No. x 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin x 2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.733	10.41	8.58	NO DATA	301.4	1010.25	1.43E 01	13.698	205.943
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin x 2/3)	(Meter MSL)	(Millibar)			
12.833	9.77	8.72	NO DATA	-0.53	1011.35			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin x 2/3)
18.35	12.912	13.928	14.107	8.429E-03	75.83	6.875E-03	11.121	14.665	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin x 2/3)
9.28	12.924	14.040	14.130	8.512E-03	76.02	6.930E-03	11.234	14.779	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080130  
START TIME: 1:36:40 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.008 AT GMM	MOMENTUM FLUX (Nt/m2) -1.04E-01	FRICITION VELOCITY (Meters/sec) 3.869E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) \cdot 1/(L \cdot (Z1/Z2)^{4/3})$ (Z1+Z2)/2	GENERAL FORM: $N' \cdot SLOPE = 1/(LN(Z1-PS1) - (LN(Z2-PS1))) / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.04E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.413E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.16E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.03E 00
Z/L AT GMM -0.011	LAT. HEAT FLUX (Watts/m2) 7.51E 01	SCALING POT. TEMP. (Kelvin) -9.018E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.43E 03
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 4.33E 00	ROUGHNESS LENGTH (Meters) 1.994E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.25E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -5.99E 01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.649E-03		N=LTEMP. STRUCT. (KvM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.38E 01			
MONIN-OBUKHOV LENGTH (Meters) -1.188E 03				
PS11 AT Z1 = 0.054168 PS11 AT Z2 = 0.078070 PS12 AT Z1 = 0.031078 PS12 AT Z2 = 0.016990	DOWNW. RATIO (no units) 0.058			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUM. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2265

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2: +/- 0.01-3 Kg/Kg.

AIR SPECIFIC HEAT (J/Kg K)
0.4149E 02

WATER LAT. HEAT VAP (J/Kg K)
5.4008E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 2905080130  
 START TIME: 1:36:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.821	9.84	8.70	NO DATA	1011.25	13.608	-0.787	-0.689	0.418	0.516
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.919	14.026	14.124	8.507E-03	75.99	6.930E-03	11.221	14.766	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.027 AT GNM	MOMENTUM FLUX (Nt/m2) -1.52E-01	FRICTION VELOCITY (Meters/sec) 3.521E-01	WITH LONG. VFLOCITY (Meter2/sec2) -1.240E-01	AIR DENSITY (Kg/m3) 1.2267
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 4.23E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.798E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.232E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4150E 02
Z/L AT GNM -0.954	LAT. HEAT FLUX (Watts/m2) 1.05E 02	SCALING POT. TEMP. (Kelvin) -2.340E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.238E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9006E 05
Z/L AT 10 METERS 0.026	SEN. HEAT FLUX (Watts/m2) 1.02E 01	ROUGHNESS LENGTH (Meters) 1.431E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.563
MONIN-OBUKHOV LENGTH (Meters) -3.867E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.280E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.29E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.45
	BOWEN RATIO (no units) 0.098			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
159%	159%	105%	161%	132%	10%	129%	293%	52%	108%	79%	72%	105%
283%	283%	46%	40%	131%	10%	34%	171%	23%	63%	154%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 2905080130  
 START TIME: 1:36:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.016 [0.02] AT GNM	MOMENTUM FLUX (Nt/m2) -1.62E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.627E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GNM=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 3.99E-05 [9.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.550E-05 [3.0E-05]
Z/L AT GNM -0.021 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.87E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.392E-02 [2.0E-02]
Z/L AT 10 METERS -0.016 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.29E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.641E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -6.216E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.38E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.29E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.083 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GNM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
46%	44%	10%	17%	40%	0%	17%	25%	5%	20%	38%	18%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905080200  
START TIME: 2: 7: 0 PST  
END TIME: 2:37:10 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.816	4.898	5.169	4.988	4.676	-0.103	4.683

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.951	3.874	2.534	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DPT.CAL.	DPT.CAL.	WTD.CAL.	WS1.C	WS2.C
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126963	1421 128025	0.157	143	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA PAGE	VOLT.REF.DV1	VOLT.REF.DV2	ZERO REF.DV1	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.):.005V	B(No.):.005V	(No.):.002V	(No.):.05V	(No.):1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.696	9.96	8.45	NO DATA	304.2	1009.95	1.43E 01	13.595	285.909

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.803	9.38	8.57	NO DATA	-0.49	1011.05

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.876	13.881	14.060	8.352E-03	75.33	6.814E-03	11.019	14.626	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.893	13.997	14.047	8.425E-03	75.41	6.868E-03	11.118	14.744	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080200  
START TIME: 2: 7: 0 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NWL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.015 AT GHM	MOMENTUM FLUX (N/m2) -1.56E-01	FRICTION VELOCITY (Meters/sec) 3.566E-01	GENERAL FORM: DN/DZ= [(N1-N2)/(Ln(Z1/Z2))] (Z1*Z2)^(1/2)	GENERAL FORM: N'SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI2)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.89E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.521E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 6.43E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.12E 00
Z/L AT GHM -0.020	LAT. HEAT FLUX (Watts/m2) 7.04E 01	SCALING POT. TEMP. (Kelvin) -1.346E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.29E 03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m2) 5.95E 00	ROUGHNESS LENGTH (Meters) 1.496E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.84E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -4.02E 01
Z/L AT Z1 -0.020	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.542E-05		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.014	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.07E 01			
MUNIN-DUKKHU LENGTH (Meters) -6.638E 02	ROWEN RATIO (no units) 0.084			
PSI1 AT Z1= 0.092465 PSI1 AT Z2= 0.048908 PSI2 AT Z1= 0.057086 PSI2 AT Z2= 0.029819				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUN. PRANDTL NUMBER	PROFILE TUN. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2+ +/- .08E-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2263

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4148E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9010E 05



RUN NUMBER: 7905080200  
 START TIME: 2: 7: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.790	9.45	8.55	NO DATA	1010.96	13.595	-0.885	-0.707	0.388	0.486

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.00	12.888	13.983	14.081	8.416E-03	75.40	6.862E-03	11.107	14.731	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978).

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.031 AT GMH	MOMENTUM FLUX (Nt/m2) -1.37E-01	FRICTION VELOCITY (Meters/sec) 3.347E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.120E-01	AIR DENSITY (Kg/m3) 1.2266
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.15E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.012E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.155E-05	AIR SPECIFIC HEAT (Ical./Kg Kel.) 2.4148E 02
Z/L AT GMH -0.039	LAT. HEAT FLUX (Watts/m2) 1.03E 02	SCALING POT. TEMP. (Kelvin) -2.435E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.149E-03	WATER LAT. HEAT VAP. (Ical./Kg) 5.9008E 05
Z/L AT 10 METERS -0.030	SEN. HEAT FLUX (Watts/m2) 1.01E 01	ROUGHNESS LENGTH (Meters) 1.195E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.545
MONIN-OBUKHOV LENGTH (Meters) -3.358E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.254E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.27E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.16
	BOWEN RATIO (no units) 0.098			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
142%	142%	110%	163%	111%	10%	126%	274%	55%	108%	56%	75%	110%
201%	201%	46%	40%	129%	10%	34%	169%	23%	63%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER 7905080200  
 START TIME: 2: 7: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.43E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.412E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.90E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.79E-05 (3.0E-05)
Z/L AT GMH -0.028 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.63E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.640E-02 (2.0E-02)
Z/L AT 10 METERS -0.021 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.87E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.305E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.724E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.331E 03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.19E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.093 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-".

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
37%	35%	7%	20%	26%	0%	18%	8%	3%	21%	30%	12%	12%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080230  
START TIME: 2:37:20 PST  
END TIME: 3: 7:50 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.265	0.001	0.001	4.880	4.953	4.543	4.424	4.667	-0.103	4.665
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.742	3.076	2.534	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126653	1421 127678	0.157	138	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >SV)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.88

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.463	3.76	8.03	NO DATA	303.6	1009.82	1.43E 01	13.586	285.877
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.776	8.34	8.90	NO DATA	-0.41	1010.92			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	1.843	13.879	14.058	8.571E-03	77.47	6.993E-03	11.305	14.593	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.860	13.991	14.081	8.614E-03	77.27	7.023E-03	11.367	14.711	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080230  
START TIME: 2:37:20 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.029 AT GMH	MOMENTUM FLUX (Nt/m2) -8.99E-02	FRICTION VELOCITY (Meters/sec) 2.708E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[ln(Z1/Z2)] * (Z1+Z2)/2	GENERAL FORM: N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.715E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DMS/DZ = 4.66E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.48E 00
Z/L AT GMH 0.037	LAT. HEAT FLUX (Watts/m2) 5.51E 01	SCALING POT. TEMP. (Kelvin) -1.410E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.05E 03
Z/L AT 10 METERS -0.028	SEN. HEAT FLUX (Watts/m2) 4.74E 00	ROUGHNESS LENGTH (Meters) 5.485E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.87E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.87E 01
Z/L AT Z1 -0.026	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAIN COEF. AT 10 METERS (Dimensionless) 1.101E-03		N=LnTEMP. STRUCT. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT? SLOPE=NO DATA
MINIM-DROKHOF LENGTH (Meters) -3.536E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.42E 01			
PSI1 AT Z1 = 0.159912 PSI1 AT Z2 = 0.387546 PSI2 AT Z1 = 0.100390 PSI2 AT Z2 = 0.053977	BOWEN RATIO (no units) 0.086			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL TUR. PRANDTL NUMBER	PRANDTL TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2+ +/- .00E-3 Kq/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3)	AIR SPECIFIC HEAT (ITcal./Kg Kel.)	WATER LAT. HEAT VAP. (ITcal./Kg)
1.2262	2.4151E 02	5.9012E 03

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905080230  
 START TIME: 2:37:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.757	WIND SPEED (Meter/sec) 8.39	DEW POINT (Celsius) 8.89	TEMP.STRUC. (Kelvin-2/3) NO DATA	BAR.PRES. (Millibar) 1010.82	BULK WT TEMP (Celsius) 13.586	AIR-WT TEMP (Kelvin) -0.829	POT-WT TEMP (Kelvin) -0.731	VIR-WT TEMP (Kelvin) 0.391	V.POT-WT TEMP (Kelvin) 0.489
HEIGHT (Meters) 10.30	POT. TEMP. (Celsius) 12.855	VIR. TEMP. (Celsius) 13.977	V.POT. TEMP. (Celsius) 14.075	ABS.HUMID. (Kg/m3) 8.609E-03	REL.HUMID. (Percent) 77.29	SPEC.HUMID. (Kg/Kg) 7.020E-03	VAP. PRES. (Millibars) 11.360	S.VAP. PRES. (Millibars) 14.697	REF. INDEX (Kelvin-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.046 AT GMH	MOMENTUM FLUX (Nt/m2) -1.02E-01	FRICTION VELOCITY (Meters/sec) 2.888E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.338E-02	AIR DENSITY (Kg/m3) 1.2264
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.47E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.788E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.466E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4152E 02
Z/L AT GMH -0.057	LAT. HEAT FLUX (Watts/m2) 8.56E 01	SCALING POT. TEMP. (Kelvin) -2.647E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.643E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9010E 05
Z/L AT 10 METERS -0.044	SEN. HEAT FLUX (Watts/m2) 9.48E 00	ROUGHNESS LENGTH (Meters) 6.981E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.533
MONIN-OBUKHOV LENGTH (Meters) -2.299E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.184E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.174E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.09E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.02
	BOWEN RATIO (no units) 0.111			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
162%	162%	134%	176%	124%	10%	131%	300%	67%	110%	57%	87%	134%
198%	198%	46%	41%	126%	10%	34%	167%	23%	64%	149%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080230  
 START TIME: 2:37:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.037 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -7.91E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.842E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.23E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.657E-05 [3.0E-05]
Z/L AT GMH -0.046 [0.02]	LAT. HEAT FLUX (Watts/m2) 7.99E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.753E-02 [2.0E-02]
Z/L AT 10 METERS -0.035 [0.02]	SEN. HEAT FLUX (Watts/m2) 7.08E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.485E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.847E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 1.184E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.02E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.102 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
23%	22%	7%	23%	33%	0%	20%	13%	4%	18%	34%	12%	0%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905080300  
START TIME: 3: 7:40 PST  
END TIME: 3:37:40 PST  
START DATE: 8 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.880	4.948	4.484	4.378	4.659	-0.103	4.657

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.938	3.873	2.535	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NPAR	UPWIND LAND	DPPFCAL	DPPFCAL	WTBFCAL	WTBFCAL	WSEFC	WSEFC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126740	1421 127762	0.157	132	-0.008	-0.000	0.000	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 1.005V)	B(No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.675	8.65	8.83	NO DATA	393.3	1009.69	1.43E 01	13.582	285.606

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.776	8.26	8.87	NO DATA	-0.32	1010.78

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.855	13.890	14.070	8.571E-03	77.43	6.994E-03	11.306	14.602	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.866	13.995	14.085	8.595E-03	77.08	7.309E-03	11.342	14.715	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080300  
START TIME: 3: 7:40 PST  
START DATE: 8 May 1979 (DAY 120)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.023 AT GMH	MOMENTUM FLUX (Nt/m2) -7.58E-02	FRICTION VELOCITY (Meters/sec) 2.486E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.92E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.630E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.36E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.61E 00
Z/L AT GMH 0.030	LAT. HEAT FLUX (Watts/m2) 5.00E 01	SCALING POT. TEMP. (Kelvin) -9.739E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.14E 03
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 3.00E 00	ROUGHNESS LENGTH (Meters) 3.937E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.31E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -5.55E 01
Z/L AT Z1 -0.042	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.73E 01		N=LnTEMP. STRUC. (Kkm-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.021				
MONIN-OBUKHOV LENGTH (Meters) -4.372E 02				
PSI1 AT Z1 = 0.133532 PSI1 AT Z2 = 0.072157 PSI2 AT Z1 = 0.083313 PSI2 AT Z2 = 0.044297	BOWEN RATIO (no units) 0.060			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2260

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(Jtcal./Kg Kel.)  
2.4151E 02

WATER LAT. HEAT VAP.  
(Jtcal./Kg)  
5.9012E 05

RUN NUMBER: 7905080300  
 START TIME: 3: 7:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.764	WIND SPEED (Meter/sec) 8.30	DEW POINT (Celsius) 8.86	TEMP. STRUC. (Kel.xm-2/3) NO DATA	BAR. PRES. (Millibar) 1010.69	BULK WT TEMP (Celsius) 13.582	AIR-WT TEMP (Kelvin) -0.818	POT-WT TEMP (Kelvin) -0.720	VIR-WT TEMP (Kelvin) 0.460	V POT-WT TEMP (Kelvin) 0.498
HEIGHT (Meters) 10.00	POT. TEMP. (Celsius) 13.862	VIR. TEMP. (Celsius) 13.982	V. POT. TEMP. (Celsius) 14.080	ABS. HUMID. (Kg/m3) 8.593E-03	REL. HUMID. (Percent) 77.12	SPEC. HUMID. (Kg/Kg) 7.807E-03	VAP. PRES. (Millibars) 11.338	S. VAP. PRES. (Millibars) 14.702	REF. INDEX (Kel.xm-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRRD STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRRD SCALING PARAMETERS	INFERRRD MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.047 AT 10M	MOMENTUM FLUX (Nt/m2) -9.96E-02	FRICTION VELOCITY (Meters/sec) 2.850E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.121E-02	AIR DENSITY (Kg/m3) 1.2262
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.44E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.852E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.443E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4151E 02
Z/L AT 10M -0.058	LAT. HEAT FLUX (Watts/m2) 8.51E 01	SCALING POT. TEMP. (Kelvin) -2.632E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.499E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9010E 05
Z/L AT 10 METERS -0.044	SEN. HEAT FLUX (Watts/m2) 9.36E 00	ROUGHNESS LENGTH (Meters) 6.646E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.527
MONIN-OBUKHOV LENGTH (Meters) -2.252E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.178E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.09E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.89
	ROSEN RATIO (no units) 0.109			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
189%	189%	143%	182%	150%	10%	135%	333%	71%	111%	79%	91%	143%
199%	199%	46%	11%	127%	10%	34%	168%	23%	64%	150%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080300  
 START TIME: 3: 7:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.035 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -9.38E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.761E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.19E-05 (8.0E 06)	SCALING SPEC. HUMID. (Kg/Kg) -8.679E-05 (3.0E-05)
Z/L AT 10M -0.043 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.87E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.545E-02 (2.0E-02)
Z/L AT 10 METERS -0.033 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.41E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.779E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -2.998E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.144E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.00E 02 (3.0E+01)	
	ROSEN RATIO (no units) 0.093 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROSEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
34%	32%	14%	26%	49%	0%	24%	28%	7%	19%	43%	24%	41%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080330  
START TIME: 3:37:50 PST  
END TIME: 4:7:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.890	4.968	4.446	4.330	4.648	-0.102	4.738

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. REF. B
5.937	5.867	2.554	0.901	0.991	0.001	0.901	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WIFFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.126867	1421.127933	0.157	12%	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS (TRANSLATED INTO ENGINEERING UNITS):

CHANNEL FLAG	ERROR COUNT	DATA BASE	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOL. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.607	8.57	8.89	NO DATA	106.1	1009.52	1.43E 01	13.580	285.900

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)
12.793	8.17	8.95	NO DATA	-0.21	1010.62

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.857	13.907	14.087	8.602E-03	77.66	7.021E-03	11.347	14.611	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.29	12.883	14.022	14.112	8.663E-03	77.62	7.066E-03	11.433	14.729	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080330  
START TIME: 3:37:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.031 AT 6M	MOMENTUM FLUX (Nt/m2) -8.57E-02	FRICTION VELOCITY (Meters/sec) 2.645E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) * (Z1*Z2)^{1/2}]$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.10E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.739E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 4.53E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.51E 00
Z/L AT 6M -0.039	LAT. HEAT FLUX (Watts/m2) 5.40E 01	SCALING POT. TEMP. (Kelvin) -1.423E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.07E 03
Z/L AT 10 METERS -0.030	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	ROUGHNESS LENGTH (Meters) 5.009E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.88E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.80E 01
Z/L AT Z1 0.000	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.29E 01	DRAINAGE COEFF. AT 10 METERS (Dimensionless) 1.181E 03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.028	BOWEN RATIO (no units) 0.086			
MINI-MORPHOV LENGTH (Meters) -3.328E 02				
PSI1 AT Z1 = 0.168218 PSI1 AT Z2 = 0.092462 PSI2 AT Z1 = 0.105800 PSI2 AT Z2 = 0.057084				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK GEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SLOPE +/- .08E 3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2257

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4152E 02

WATER LAT. HEAT VAP.  
(ITcal./kg)  
5.9011E 05

RUN NUMBER: 7905080330  
 START TIME: 3:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DFW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.788	8.22	8.97	NO DATA	1010.52	13.588	-0.800	-0.702	0.428	0.526

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.878	14.008	14.106	8.654E-03	77.63	7.061E-03	11.423	14.715	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERR'D STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.048 AT GMH	MOMENTUM FLUX (Nt/m2) -9.70E-02	FRICTION VELOCITY (Meters/sec) 2.813E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.914E-02	AIR DENSITY (Kg/m3) 1.2259
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.33E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.669E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.335E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.058	LAT.HEAT FLUX (Watts/m2) 8.24E 01	SCALING POT.TEMP. (Kelvin) -2.597E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 7.306E-03	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9009E 05
Z/L AT 10 METERS -0.045	SEN.HEAT FLUX (Watts/m2) 9.06E 00	ROUGHNESS LENGTH (Meters) 6.333E-05		VAP.PRES. AT WT LEVEL (Millibar) 15.523
MONIN-ORUKHOV LENGTH (Meters) -2.224E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.172E-03		ABS.HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.06E 02			BAR.PRES. AT WT LEVEL (Millibar) 1011.72
	BOWEN RATIO (no units) 0.110			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
163%	163%	135%	177%	124%	10%	131%	302%	67%	110%	57%	87%	135%
201%	201%	46%	41%	129%	10%	34%	170%	23%	64%	152%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080330  
 START TIME: 3:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.039 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -9.41E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.770E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.12E-05 (8.0E-06)	SCALING SPEC.HUMID. (Kg/Kg) -8.589E-05 (3.0E-05)
Z/L AT GMH -0.048 (0.02)	LAT.HEAT FLUX (Watts/m2) 7.70E 01 (2.0E+01)	SCALING POT.TEMP. (Kelvin) -1.743E-02 (2.0E-02)
Z/L AT 10 METERS -0.037 (0.02)	SEN.HEAT FLUX (Watts/m2) 6.82E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.894E-05 (6.0E-05)
MONIN-ORUKHOV LENGTH (Meters) -2.723E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.174E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.90E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.101 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
22%	20%	7%	22%	32%	8%	19%	12%	3%	18%	32%	12%	0%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080400  
START TIME: 4: 7:50 PST  
END TIME: 4:37:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 10 MIN  
DATA AVERAGING PERIOD: 30 MIN  
NUMERATURE: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	BAR. PRES. 2	WIND DIR.
6.205	0.000	0.001	4.897	4.971	4.294	4.197	4.639	0.110	4.055

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.926	5.654	2.535	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	W1 CAL	W2 CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)
1411 125541	1421 126692	0.183	116	-0.008	0.055	0.000	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	117.4	180

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SP. PRES.	BULK WT TEMP	MAN. AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Deg True)	(Millibar)	(Millibar)	(Celsius)	(Celsius)
12.554	0.28	8.94	NO DATA	310.4	1009.39	1.431 91	14.170	12.554

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TARGE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Meter MSL)	(Millibar)
12.669	7.87	9.01	NO DATA	-0.05	1010.48

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAR. PRES. 1	VAR. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Celsius)
18.35	12.734	13.778	13.957	8.631E-03	78.58	7.643E-03	11.381	14.480	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAR. PRES. 2	VAR. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Celsius)
9.20	12.759	13.899	13.989	8.675E-03	78.36	7.671E-03	11.447	14.606	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080400  
START TIME: 4: 7:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 10 MIN  
DATA AVERAGING PERIOD: 30 MIN  
NUMERATURE: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SEALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (LINKING WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.046 AT 6M	MOMENTUM FLUX (N/m2) -9.54E-02	FRICTION VELOCITY (meters/sec) 2.789E-01	GENERAL FORM DN/DZ (DN/DZ1)/(DN/DZ2) (Z1+Z2)/(Z1-Z2)	GENERAL FORM N SLOPE (N/DZ1)/(N/DZ2) (N1-N2)/(Z1-Z2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 2.33E-05	SEALING SPEC. HUMID (Kg/Kg) -6.90E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DN/DZ= 4.61E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1=PS2 N SLOPE 1.43E-01
Z/L AT 6M -0.056	LAT. HEAT FLUX (Watts/m2) 5.83E-01	SEALING POT. TEMP. (Kelvin) -2.192E-02	N-SPEC HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ= -8.92E-06	N-SPEC HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1=PS2 N SLOPE -0.03E-03
Z/L AT 10 METERS -0.043	SEN. HEAT FLUX (Watts/m2) 7.58E-00	ROUGHNESS LENGTH (Meters) 6.135E-05	N-POT TEMP (Kelvin) Z-HEIGHT (Meters) DPT/DZ= 2.83E-03	N-POT TEMP (Kelvin) Z-HEIGHT (M) Vert Axis PS1=PS2 N SLOPE -2.43E-01
Z/L AT Z1 -0.077	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.43E-03	N-ENTR. STRUCL. (K/M) DZ Z-HEIGHT (M) Vert Axis PS1=NON ENT SLOPE=NO DATA	
Z/L AT Z2 0.039	TOTAL HEAT RADIAT FLUX (Watts/m2) 8.02E-01			
MININ DRUKNOW LENGTH (Meters) 2.336E-02	ROBIN RATIO (No. units) 0.130			
PS1 AT Z1: 0.224135 PS1 AT Z2: 0.126392 PS12 AT Z1: 0.147597 PS12 AT Z2: 0.970724				

## \* GENERAL CONSTANTS

## MISCELLANEOUS

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7979	PROFITE TUR SCHMIDT NUMBER 0.74	PROFITE TUR SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSE COEF. 0.92E-03	BULK MOISTURE TRANSE COEF. 1.30E-03
--	--	--	--	--	--

AIR DENSITY  
(Kg/m3)  
1.2260

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SHI SH2= 2 DHI 3 Kg/Kg

AIR SPECIFIC HEAT  
(J/Kg K)  
1.013E+03

WATER LAT. HEAT CAP  
(J/Kg K)  
5.901E+02

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905080400  
 START TIME: 4: 7:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin 2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.655	7.92	9.00	NO DATA	1010.39	13.570	-0.914	-0.816	0.315	0.413

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin 2/3)
10.00	12.753	13.884	13.982	8.672E-03	78.39	7.072E-03	11.439	14.593	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.061 AT GMH	MOMENTUM FLUX (Nt/m2) -8.86E-02	FRICTION VELOCITY (Meters/sec) 2.688E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.223E-02	AIR DENSITY (Kg/m3) 1.2263
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.19E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.668E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.186E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.073	LAT. HEAT FLUX (Watts/m2) 7.87E 01	SCALING POT. TEMP. (Kelvin) -2.956E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 7.946E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9016E 05
Z/L AT 10 METERS -0.056	SEN. HEAT FLUX (Watts/m2) 9.85E 00	ROUGHNESS LENGTH (Meters) 5.328E-05		VAP. PRES. AT WT LF LL (Millibar) 15.510
MONIN-OBUKHOV LENGTH (Meters) -1.782E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.152E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.03E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.59
	BOWEN RATIO (no units) 0.125			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
141%	141%	127%	173%	104%	10%	126%	277%	64%	109%	40%	84%	127%
191%	191%	46%	41%	119%	10%	34%	160%	23%	64%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080400  
 START TIME: 4: 7:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.052 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -9.04E-02 [6.0E-02]	FRICTION VELOCITY (Meter /sec) 2.715E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.03E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.644E-05 [3.0E-05]
Z/L AT GMH -0.063 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.48E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.361E-02 [2.0E-02]
Z/L AT 10 METERS -0.048 (0.02)	SEN. HEAT FLUX (Watts/m2) 8.64E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.602E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 2.084E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.43E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.217E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.81E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.127 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE "+or-" IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF
14%	14%	4%	16%	13%	0%	13%	2%	2%	17%	19%	7%	13%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080430  
START TIME: 4:37:50 PST  
END TIME: 5: 7:46 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 01	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL.T. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.000	0.001	4.910	4.982	4.228	4.129	4.638	-0.097	4.849

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK MT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.720	3.627	2.536	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH PAIR (Meters)	HEIGHT/LENGTH PAIR (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.174693	1421.175907	0.157	110	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.05V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	100	0	0	0	0	0	115.4	59.63

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK MT TEMP	MEAN AIR TEMP
(Celsius)	(Meters/sec)	(Celsius)	(Kel.xm-2/3)	(0-9 True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.489	8.15	9.01	NO DATA	51.9	1009.36	1.35E 01	13.564	285.704

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meters/sec)	(Celsius)	(Kel.xm-2/3)	(Meter MSL)	(Millibar)
12.599	7.80	9.07	NO DATA	0.02	1010.46

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
10.35	12.669	13.719	13.899	8.678E-03	79.33	7.080E-03	11.440	14.420	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
9.20	12.689	13.833	13.924	8.717E-03	79.37	7.197E-03	11.496	14.540	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080430  
START TIME: 4:37:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (=Stable, =Unstable) -0.047 AT 0M	MOMENTUM FLUX (Nt/m2) -7.24E-02	FRICTION VELOCITY (Meters/sec) 2.431E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)] + (Z1*Z2)/1/2	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
DISPERSED MEAN HEIGHT (Meters) LHM=(Z1+Z2)/1/2 12.99	HUMIDITY FLUX (Kg/sec. m2) 2.06E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.914E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 4.00E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.65E 00
Z/L AT 0M 0.057	LAT. HEAT FLUX (Watts/m2) 5.09E 01	SCALING POT. TEMP. (Kelvin) -1.701E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.87E 03
Z/L AT 10 METERS -0.044	SEN. HEAT FLUX (Watts/m2) 5.13E 00	ROUGHNESS LENGTH (Meters) 3.597E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.19E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -3.19E 01
Z/L AT Z1 0.091	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.16E 03		N=LNTMP. STRUCT. (Kxm-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.040	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.95E 01			
MIN. DRAG LENGTH (Meters) -2.079E 02	BURNIN RATIO (no units) 0.101			
PSI1 AT Z1 = 0.028506 PSI1 AT Z2 = 0.129136 PSI2 AT Z1 = 1.145409 PSI2 AT Z2 = 0.080465				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec. 2)	PROF. PRANDTL NUMBER	PROF. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7979	0.74	0.74	0.97E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation stemmed from measurement of Profile Slope and/or Partial Derivative.  
Computation executed by computer of:

SHI 001 +2 DHI 5 Kg/Kg

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2263

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4153E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9022E 05

RUN NUMBER: 7905080430  
 START TIME: 4:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.585	7.84	9.06	NO DATA	1010.36	13.564	-0.979	-0.881	0.255	0.353

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.683	13.820	13.918	8.713E-03	79.10	7.104E-03	11.490	14.526	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.067 AT 6M	MOMENTUM FLUX (Nt/m2) -8.65E-02	FRICTION VELOCITY (Meters/sec) 2.655E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.050E-02	AIR DENSITY (Kg/m3) 1.2265
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.11E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.545E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.109E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT 6M -0.079	LAT. HEAT FLUX (Watts/m2) 7.68E 01	SCALING POT. TEMP. (Kelvin) -3.145E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.352E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9020E 05
Z/L AT 10 METERS -0.061	SEN. HEAT FLUX (Watts/m2) 1.04E 01	ROUGHNESS LENGTH (Meters) 5.086E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.505
MONIN-OBUKHOV LENGTH (Meters) -1.634E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.147E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.56
	BOWEN RATIO (no units) 0.135			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
165%	165%	146%	183%	124%	10%	135%	307%	73%	111%	51%	93%	146%
187%	187%	46%	41%	115%	10%	34%	156%	23%	64%	138%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080430  
 START TIME: 4:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.056 (0.02) AT 6M	MOMENTUM FLUX (Nt/m2) -8.31E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.601E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.99E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.574E-05 (3.0E-05)
Z/L AT 6M -0.068 (0.02)	LAT. HEAT FLUX (Watts/m2) 7.21E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.093E-02 (2.0E-02)
Z/L AT 10 METERS -0.052 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.84E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.814E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.923E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.141E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.43E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.123 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
18%	17%	10%	21%	33%	0%	19%	15%	5%	16%	38%	13%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080500  
START TIME: 5: 7:50 PST  
END TIME: 5:37:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.265	0.000	0.001	4.748	4.878	4.582	4.465	4.646	-0.036	4.959
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.914	3.677	2.535	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1FC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124702	1421 125712	0.183	101	-0.908	-0.950	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.)(.005V)	B(No.)(.005V)	(No.)(.002V)	(No.)(5V)	(No.)(Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.68

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.470	8.62	8.05	NO DATA	313.6	1009.50	4.96E 00	13.558	285.681
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.571	8.36	8.15	NO DATA	0.13	1010.59			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.650	13.621	13.601	8.129E-03	74.39	6.629E-03	10.716	14.464	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.661	13.731	13.621	8.193E-03	74.43	6.676E-03	10.804	14.516	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080500  
START TIME: 5: 7:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDS-ON NUMBER (+Stable, -Unstable) -0.016 AT 6M	MOMENTUM FLUX (Nt/m2) -1.04E-01	FRICTION VELOCITY (Meters/sec) 2.909E-01	GENERAL FORM: $DN/DZ =$ $[(N1-N2)/(ln(Z1/Z2)) +$ $(Z1*Z2)^(1/2)]$	GENERAL FORM: $N'SLOPE =$ $1/(LnZ1-PSI1) - (LnZ2-PSI2)/($ $LN1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1*Z2)^(1/2)$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.33E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.528E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS 17= 5.23E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 1.38E 00
Z/L AT 6M 0.026	LAT. HEAT FLUX (Watts/m2) 5.76E 01	SCALING POT. TEMP. (Kelvin) -9.214E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.21E 03
Z/L AT 21 -0.016	SEN. HEAT FLUX (Watts/m2) 3.32E 00	ROUGHNESS LENGTH (Meters) 7.173E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -1.26E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -5.87E 01
Z/L AT 72 -0.014	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.96E 00	DRAG COEF. AT 10 METERS (Dimensionless) 1.340E-03		N=LAT. TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-ORUKHOV LENGTH (Meters) -6.438E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.59E 01			
PSI1 AT Z1= 0.095039 PSI1 AT Z2= 0.058312 PSI2 AT Z1= 0.058716 PSI2 AT Z2= 0.038704	BOWEN RATIO (no units) 0.058			

## \* GENERAL CONSTANTS:

VON KARMAN  
CONSTANT  
(No units)  
0.4

GRAVITATION  
ACCELERATION  
(M/sec 2)  
9.7959

PROFILE  
TUR. PRANDTL  
NUMBER  
0.74

PROFILE  
TUR. SCHMIDT  
NUMBER  
0.74

BULK  
SFN HEAT  
TRANSF. COEFF.  
0.92E-03

BULK  
MOISTURE  
TRANSF. COEFF.  
1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2269

AIR SPECIFIC HEAT  
(J/cal./K x Kel.)  
2.4144E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9023E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2: +/- .081 -3 Kg/Kg.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905080500  
 START TIME: 5: 7:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.559	8.41	8.14	NO DATA	1010.50	13.558	-0.999	-0.901	0.159	0.257

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.657	13.718	13.816	8.186E-03	74.42	6.670E-03	10.793	4.503	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.054 AT GMH	MOMENTUM FLUX (Nt/m2) -1.03E-01	FRICTION VELOCITY (Meters/sec) 2.896E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.386E-02	AIR DENSITY (Kg/m3) 1.2271
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.92E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.103E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.919E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4144E-02
Z/L AT GMH -0.046	LAT. HEAT FLUX (Watts/m2) 9.68E-01	SCALING POT. TEMP. (Kelvin) -3.100E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 8.976E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9821E-05
Z/L AT 10 METERS -0.051	SEN. HEAT FLUX (Watts/m2) 1.11E-01	ROUGHNESS LENGTH (Meters) 7.056E-05		VAP. PRES. AT WT LEVEL (Millibars) 15.501
MONIN-OBUKHOV LENGTH (Meters) -1.973E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.96E-00	DRAW COEFF. AT 10 METERS (Dimensionless) 1.185E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.13E-02			BAR. PRES. AT WT LEVEL (Millibars) 1011.70
	BOWEN RATIO (no units) 0.115			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
173%	173%	122%	170%	14%	19%	149%	311%	61%	110%	80%	81%	122%
185%	185%	46%	39%	113%	19%	36%	153%	23%	62%	136%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080500  
 START TIME: 5: 7:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERROR. WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.03E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 2.899E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.62E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -9.39E-05 (3.0E-05)
Z/L AT GMH -0.042 (0.02)	LAT. HEAT FLUX (Watts/m2) 8.95E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.729E-02 (2.0E-02)
Z/L AT 10 METERS -0.033 (0.02)	SEN. HEAT FLUX (Watts/m2) 7.65E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 7.097E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -3.076E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.96E-00 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 1.224E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.04E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.096 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
56%	54%	0%	26%	51%	0%	27%	31%	0%	25%	56%	1%	2%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905000530  
START TIME: 5:37:50 PST  
END TIME: 6:00:00 PST  
START DATE: 8 May 1979 (DAY 120)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.672	4.758	4.685	4.526	4.653	0.096	5.202
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.902	3.759	2.534	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.171044	1401.121587	0.199	68	-0.008	-0.050	0.030	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. Spans)	(No. Spans)	(No. Spans)	A (No.) .005V	B (No.) .005V	(No.) .002V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.76

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
15.104	9.02	7.59	NO DATA	321.9	1009.59	-1.34E 01	13.546	285.292
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.159	8.44	7.73	NO DATA	0.22	1010.69			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
10.35	12.284	13.219	13.397	7.892E-03	73.88	6.425E-03	10.389	14.063	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
7.23	12.249	13.284	13.374	7.974E-03	74.31	6.467E-03	10.499	14.129	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 2905000530  
START TIME: 5:37:50 PST  
START DATE: 8 May 1979 (DAY 120)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ = Stable, - = Unstable) 0.032 AT GMM	MOMENTUM FLUX (Nt/m2) -9.08E-02	FRICTION VELOCITY (Meters/sec) 2.718E-01	GENERAL FORM: DN/DZ = [(N1-N2)/1]/[ln(Z1/Z2)] (Z1*Z2)^(1/2)	GENERAL FORM: N' SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM = (Z1+Z2)/1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.50E-05	SCALING SPEC. HUMID. (Kg/Kg) -4.731E-05	N = WIND SPEED (M/sec) Z = HEIGHT (Meters) DWS/DZ = 6.48E-02	N = WIND SPEED (M/sec) Z = HEIGHT (M) Vert. Axis PSI = PSI1 WS SLOPE = 1.47E 00
Z/L AT GMM 0.056	LAT. HEAT FLUX (Watts/m2) 3.91E 01	SCALING POT. TEMP. (Kelvin) 2.085E-02	N = SPEC. HUMIDITY (Kg/Kg) Z = HEIGHT (Meters) DSH/DZ = -8.92E-06	N = SPEC. HUMIDITY (Kg/Kg) Z = HEIGHT (M) Vert. Axis PSI = PSI2 SH SLOPE = -1.14E 04
Z/L AT 10 METERS 0.038	SEN. HEAT FLUX (Watts/m2) -7.04E 00	ROUGHNESS LENGTH (Meters) 5.560E-05	N = POT. TEMP. (Kelvin) Z = HEIGHT (Meters) DPT/DZ = 3.93E-03	N = POT. TEMP. (Kelvin) Z = HEIGHT (M) Vert. Axis PSI = PSI2 PTK SLOPE = 2.59E 01
Z/L AT Z1 0.071	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.34E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.114E-03		N = Ln TEMP. STRUCT. (K/m 2/3) Z = HEIGHT (M) Vert. Axis PSI = NONE CT2 SLOPE = NO DATA
Z/L AT Z2 0.035	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.86E 01			
MONIN-OBUKHOV LENGTH (Meters) 2.199E 02	BOWEN RATIO (no units) -0.180			
PSI1 AT Z1 = -0.331098 PSI1 AT Z2 = -0.166491 PSI2 AT Z1 = -0.448511 PSI2 AT Z2 = -0.224866				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2288

AIR SPECIFIC HEAT  
(J/cal./Kg K.)  
2.4139E 02

WATER LAT HEAT VAP.  
(J/cal./Kg)  
5.9045E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1 SH2 = +/- 0.001 -3 Kg/Kg.

RUN NUMBER: 7905080530  
 START TIME: 5:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

WIND TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.152	8.51	7.71	NO DATA	1010.60	13.546	-1.394	-1.296	-0.270	-0.172

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. m-2/3)
10.00	12.350	13.276	13.374	7.964E-03	74.26	6.479E-03	10.486	14.121	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.072 AT GMH	MOMENTUM FLUX (Nt/m2) -1.06E-01	FRICTION VELOCITY (Meter/sec) 2.938E-01	WITH LONG. VELOCITY (Meter2/sec2) -8.633E-02	AIR DENSITY (Kg/m3) 1.2291
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.164E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.205E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4140E 02
Z/L AT GMH -0.085	LAT. HEAT FLUX (Watts/m2) 1.04E 02	SCALING POT. TEMP. (Kelvin) -4.135E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.215E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9044E 05
Z/L AT 10 METERS -0.066	SEN. HEAT FLUX (Watts/m2) 1.51E 01	ROUGHNESS LENGTH (Meters) 7.445E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.490
MONIN-OBUKHOV LENGTH (Meters) -1.520E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.34E 01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.192E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.06E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.80
	BOWEN RATIO (no units) 0.145			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
107%	141%	102%	160%	82%	10%	105%	242%	51%	109%	32%	71%	102%
169%	169%	46%	39%	97%	10%	32%	135%	23%	62%	120%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080530  
 START TIME: 5:37:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.01E-01 (6.0E-02)	FRICTION VELOCITY (Meter/sec) 2.870E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.627E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -9.142E-05 (3.0E-05)
Z/L AT GMH 0.012 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.13E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 7.878E-03 (2.0E-02)
Z/L AT 10 METERS 0.009 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.15E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.733E-05 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.113E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.34E 01 (2.0E+01)	DRAG COEFF. AT 10 METERS (Meters) 1.170E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.52E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.029 (0.30)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
266%	266%	8%	42%	353%	0%	58%	211%	4%	39%	180%	14%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080600  
START TIME: 6: 8:10 PST  
END TIME: 6:38:20 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.657	4.734	4.417	4.287	4.667	0.352	5.178
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.903	3.727	2.534	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W2FCAL	W3FCAL
AIR TEMP. 1	AIR TEMP. 2	HFICHI/LENGTH		PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 117011	1421 117750	0.199		0.5	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.73

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Milliarc)	(Celsius)	(Kelvin)
11.701	8.51	7.50	NO DATA	321.1	1009.82	-4.91E 01	13.548	284.898
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TALL	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
11.775	8.00	7.59	NO DATA	0.29	1010.91			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.881	12.807	12.987	7.858E-03	75.42	6.387E-03	10.338	13.697	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.865	12.888	12.978	7.910E-03	75.49	6.424E-03	10.401	13.779	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080600  
START TIME: 6: 8:10 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
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NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.019 AT GHM	MOMENTUM FLUX (Nt/m2) -8.22E-02	FRICTION VELOCITY (Meters/sec) 2.585E-01	GENERAL FORM: $DN/DZ = \frac{(N1-N2)}{(Z1-Z2)} \cdot \frac{(Z1+Z2)}{2}$	GENERAL FORM: $W'SLOPE = \frac{(LnZ1-PSI1)-(LnZ2-PSI2)}{(N1-N2)}$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.67E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.378E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.64E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.55E 00
Z/L AT GHM 0.028	LAT. HEAT FLUX (Watts/m2) 4.18E 01	SCALING POT. TEMP. (Kelvin) 1.044E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -1.02E 04
Z/L AT 10 METERS 0.021	SFN. HEAT FLUX (Watts/m2) -3.36E 00	ROUGHNESS LENGTH (Meters) 4.584E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.75E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 5.18E 01
Z/L AT Z1 0.039	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.148E-03		
Z/L AT Z2 0.020	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.07E 01			
MONIN-OBUKHOV LENGTH (Meters) 4.678E 02	BOWEN RATIO (no units) -0.080			N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
PSI1 AT Z1 = -0.184347 PSI1 AT Z2 = -0.092425 PSI2 AT Z1 = -0.249118 PSI2 AT Z2 = -0.124898				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- 0.01E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2308

AIR SPECIFIC HEAT  
(J/Kelvin)  
2.4138E 02

WATER LAT. HEAT VAP.  
(J/Kelvin)  
5.9068E 05



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PRINT DATE: 11 JUN 1980  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.766	8.06	7.58	NO DATA	1010.82	13.548	-1.782	-1.684	-0.669	-0.571

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel.xM-2/3)
10.00	11.864	12.870	12.976	7.904E-03	75.48	6.420E-03	10.393	13.769	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.107 AT 10M	MOMENTUM FLUX (Nt/m2) -9.30E-02	FRICTION VELOCITY (Meters/sec) 2.749E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.557E-02	AIR DENSITY (Kg/m3) 1.2311
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.05E-05	SCALING SPEC.HUMID. (Kg/Kg) -1.197E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.052E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4139E 02
Z/L AT 10M -0.125	LAT.HEAT FLUX (Watts/m2) 1.00E 02	SCALING POT.TEMP. (Kelvin) -5.271E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.449E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9066E 05
Z/L AT 10 METERS -0.096	SEN.HEAT FLUX (Watts/m2) 1.80E 01	ROUGHNESS LENGTH (Meters) 5.806E-05		VAP.PRES.AT WT LEVEL (Millibar) 15.495
MONIN-OBUKHOV LENGTH (Meters) -1.043E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 01	DRAW COEF.AT 10 METERS (Dimensionless) 1.162F-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.92E 01			BAR.PRES.AT WT LEVEL (Millibar) 1012.02
	BOWEN RATIO (no units) 0.180			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
142%	169%	111%	165%	116%	6%	73%	281%	55%	110%	60%	75%	111%
160%	160%	46%	39%	88%	6%	25%	126%	23%	62%	111%	43%	40%

\* CONTINUED BELOW

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.041 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -8.99E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.701E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.60E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -9.57E-05 [3.0E-05]
Z/L AT 10M -0.051 [0.02]	LAT.HEAT FLUX (Watts/m2) 8.91E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -1.186E-02 [2.0E-02]
Z/L AT 10 METERS -0.039 [0.02]	SEN.HEAT FLUX (Watts/m2) 8.81E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.362F-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.567E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.91E 01 [2.0E+01]	DRAW COEF.AT 10 METERS (Meters) 1.150E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.89E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.099 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
156%	151%	7%	39%	122%	0%	91%	140%	3%	36%	165%	11%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080630  
START TIME: 6:38:30 PST  
END TIME: 7: 8:30 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DFW POINT 1	DFW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.705	4.783	4.230	4.110	4.673	0.595	5.226

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.906	3.765	2.535	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 114416	1421 115073	0.199	63	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BAY F	VOLT. REF. DFW	VOLT. REF. DFW	ZFRQ REF. DFW	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 15V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	9	0	115.4	59.77

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DFW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.442	8.15	7.77	NO DATA	322.7	1009.91	-8.30E 01	13.550	284.634

AIR TEMP. 2	WIND SPEED 2	DFW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Meter MSL)	(Millibar)
11.507	7.68	7.88	NO DATA	0.33	1011.01

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
18.35	11.621	12.567	12.748	8.020E-03	78.23	6.513E-03	10.534	13.465	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
9.20	11.597	12.641	12.732	8.075E-03	78.36	6.553E-03	10.609	13.538	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080630  
START TIME: 6:38:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.033 AT GMM	MOMENTUM FLUX (Nt/m2) -5.84E-02	FRICTION VELOCITY (Meters/sec) 2.177E-01	GENERAL FORM: $DN/DZ = \frac{1}{(N1-N2)} \cdot \frac{1}{(1+(Z1/Z2)^2)^{1/2}}$	GENERAL FORM: $N'SLOPE = \frac{1}{(LnZ1-PSI) - (LnZ2-PSI)} \cdot \frac{1}{(N1-N2)}$
GEOMETRIC MEAN HEIGHT (Meter) GMM = $(Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec m2) 1.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -4.676E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 5.24E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.84E 00
Z/L AT GMM 0.052	LAT. HEAT FLUX (Watts/m2) 3.10E 01	SCALING POT. TEMP. (Kelvin) 1.399E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -1.14E 04
Z/L AT 10 METERS 0.040	SEN. HEAT FLUX (Watts/m2) -3.79E 00	ROUGHNESS LENGTH (Meters) 2.278E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 2.67E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 3.86E 01
Z/L AT Z1 0.074	SKY AND SOLAR HEAT FLUX (Watts/m2) -R.30E 01	DRAW COEF. AT 10 METERS (Dimensionless) 8.964E 04		N=TEMP. STRUCT. (K x M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.037	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.57E 01			
MONIN-OBUKHOV LENGTH (Meters) 2.480E 02	ROSEN RATIO (no units) -0.122			
PSI1 AT Z1 = -0.347822 PSI1 AT Z2 = -0.174545 PSI2 AT Z1 = -0.470030 PSI2 AT Z2 = -0.235656				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTE:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2320
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4141E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9982E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905080630  
 START TIME: 6:38:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel.xM-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.499	7.74	7.87	NO DATA	1010.91	13.550	-2.051	-1.953	-0.918	-0.820

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	11.597	12.633	12.731	8.069E-03	78.35	6.548E-03	10.600	13.530	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.139 AT 6MH	MOMENTUM FLUX (Nt/m2) -8.42E-02	FRICTION VELOCITY (Meters/sec) 2.613E-01	WITH LONG. VELOCITY (Meter2/sec2) -6.830E-02	AIR DENSITY (Kg/m3) 1.2323
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.72E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.156E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.722E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4141E 02
Z/L AT 6MH -0.159	LAT. HEAT FLUX (Watts/m2) 9.21E 01	SCALING POT. TEMP. (Kelvin) -6.086E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.590E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9081E 05
Z/L AT 10 METERS -0.123	SFN. HEAT FLUX (Watts/m2) 1.98E 01	ROUGHNESS LENGTH (Meter) 4.784E-05		VAP. PRES. AT WT LEVEL (Millibar) 15.499
MONIN-OBUKHOV LENGTH (Meters) -8.153E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.30E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.141E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.89E 01			BAR. PRES. AT WT LEVEL (Millibar) 1012.11
	BOWEN RATIO (no units) 0.215			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
128%	170%	116%	169%	102%	6%	45%	271%	58%	111%	44%	78%	116%
156%	156%	46%	39%	84%	6%	28%	123%	23%	62%	107%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080630  
 START TIME: 6:38:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.044 [0.02] AT 6MH	MOMENTUM FLUX (Nt/m2) -7.68E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.489E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.24E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.089E-05 [3.0E-05]
Z/L AT 6MH -0.058 [0.02]	LAT. HEAT FLUX (Watts/m2) 8.06E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -7.937E-03 [2.0E-02]
Z/L AT 10 METERS -0.045 [0.02]	SFN. HEAT FLUX (Watts/m2) 9.18E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.893E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.231E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.30E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.070E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.37E 00 [3.0E+01]	
	BOWEN RATIO (no units) 0.110 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
195%	182%	18%	45%	129%	0%	151%	164%	10%	39%	203%	22%	13%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905080700  
START TIME: 7: 8:40 PST  
END TIME: 7:39:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## # ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.736	4.807	4.370	4.281	4.673	1.179	5.092

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.909	3.673	2.535	0.001	0.001	0.001	0.001	6.205

## # DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
ATR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 115401	1421 116361	0.183	86	-0.008	-0.050	0.000	0.992	0.952

## # SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FRQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.67

## # OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.540	8.42	7.97	NO DATA	318.1	1009.91	-1.64E-02	13.554	284.748

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
11.636	8.02	8.03	NO DATA	0.33	1011.01

## # CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	11.720	12.682	12.862	8.119E-03	78.71	6.596E-03	10.667	13.553	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	11.726	12.782	12.072	8.154E-03	78.49	6.620E-03	10.717	13.654	NO DATA

# CONTINUED BELOW

RUN NUMBER: 7905080700  
START TIME: 7: 8:40 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## # PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.015 AT GHM	MOMENTUM FLUX (Nt/m2) -7.52E-02	FRICTION VELOCITY (Meters/sec) 2.472E-01	GENERAL FORM: DN/DZ= [(N1-N2)/1Ln(Z1/Z2)]+ (Z1*Z2)1/21	GENERAL FORM: N SLOPE= [(1/N1-PS1)-(1/N2-PS1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.99E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.524E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 4.45E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE= 1.62E 00
Z/L AT GHM -0.020	LAT. HEAT FLUX (Watts/m2) 4.91E 01	SCALING POT. TEMP. (Kelvin) -6.524E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE= -8.29E 03
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts/m2) 2.01E 00	ROUGHNESS LENGTH (Meters) 3.847E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE= -8.29E 01
Z/L AT Z1 -0.020	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.64E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.075E-03		N=LAT. TEMP. STRUC. (K.xM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.014	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.13E 02			
MONIN-OBUKHOV LENGTH (Meters) -6.549E 02	BOWEN RATIO (no units) 0.041			
PS11 AT Z1= 0.093595 PS11 AT Z2= 0.049536 PS12 AT Z1= 0.057801 PS12 AT Z2= 0.030207				

## # GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY (Kg/m3)
1.2314

## # GENERAL NOTE:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08E-3 Kg/Kg.  
PTK1-PTK2= +/- .008 Kel.

AIR SPECIFIC HEAT (ITcal./Kg Kel.)
2.4143E 02

WATER LAT. HEAT VAP. (ITcal./Kg)
5.9076E 05

# CONTINUED ON NEXT PAGE

RUN NUMBER: 7905080700  
 START TIME: 7: 8:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-M-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.624	8.07	8.02	NO DATA	1010.91	13.554	-1.929	-1.831	-0.783	-0.685

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-M-2/3)
10.00	11.722	12.770	12.868	8.150E-03	78.52	6.617E-03	10.711	13.642	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.116 AT GMH	MOMENTUM FLUX (Nt/m2) -9.32E-02	FRICTION VELOCITY (Meters/sec) 2.750E-01	WITH LONG. VELOCITY (Meter2/sec2) -7.565E-02	AIR DENSITY (Kg/m3) 1.2317
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.80E-05	SCALING SPEC.HUMID. (Kg/Kg) -1.121E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.797E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMH -0.134	LAT.HEAT FLUX (Watts/m2) 9.39E 01	SCALING POT.TEMP. (Kelvin) -5.668E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.559E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9074E 05
Z/L AT 10 METERS -0.103	SFN.HEAT FLUX (Watts/m2) 1.94E 01	ROUGHNESS LENGTH (Meters) 5.817E-05		VAP.PRES. AT WT LEVEL (Millibar) 15.502
MONIN-OBUKHOV LENGTH (Meters) -9.700E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.64E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.162E-03		ABS.HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.12E 01			BAR.PRES. AT WT LEVEL (Millibar) 1012.11
	BOWEN RATIO (no units) 0.207			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL SPEC HUMIDITY	SCAL POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
215%	215%	139%	181%	181%	5%	42%	363%	69%	112%	112%	89%	139%
157%	157%	46%	39%	85%	5%	15%	125%	23%	62%	108%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080700  
 START TIME: 7: 8:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.073 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.87E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 2.691E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.47E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -9.534E-05 [3.0E-05]
Z/L AT GMH -0.086 [0.02]	LAT.HEAT FLUX (Watts/m2) 8.59E 01 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -3.200E-02 [2.0E-02]
Z/L AT 10 METERS -0.066 [0.02]	SFN.HEAT FLUX (Watts/m2) 1.38E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 5.177E-05 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.515E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.64E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.143E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.76E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.164 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL SPEC HUMIDITY	SCAL POT. TEMP.	ROUGH. LENGTH	DRAW COEF
69%	67%	11%	31%	67%	0%	51%	54%	6%	24%	78%	17%	42%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905080730  
START TIME: 7:38:50 PST  
END TIME: 8:04:00 PST  
START DATE: 8 May 1979 (DAY 178)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND DIR	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DW. POINT 1	DW. POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
0.205	0.000	0.001	4.719	4.801	4.999	4.871	4.668	1.876	4.964
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
WIND DIR. TEMP. AC FREQ. AC VOLTAGE	5.692	2.541	0.001	0.001	0.001	0.001	5.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

NO. 1	NO. 2	UPWIND NEAR	UPWIND LAND	UPWIND	UPWIND	WIND CAL	WIND CAL	WIND CAL	WIND CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
14.117665	14.117612	0.183	0.0	0.008	-0.005	0.003	0.003	0.003	0.003

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS.

CHANNEL	FLAG	ERROR	COUNT	DATA NAME	VOLT. REF.	DEV.	VOLT. REF.	DEV.	ZERO REF.	DEV.	AC VOLT.	FLUX	AC FREQ.	FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS.

WIND DIR	WIND SPEED	DW. POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Degrees)	(meters/sec)	(Kelvin)	(Kelvin)	(Degrees)	(mbar)	(Watt/m <sup>2</sup> )	(Kelvin)	(Kelvin)
11.766	9.62	7.37	NO DATA	113.8	1009.83	-2.67E-02	13.77	284.919
WIND DIR	WIND SPEED	DW. POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Degrees)	(meters/sec)	(Kelvin)	(Kelvin)	(meters MSL)	(mbar)			
11.012	9.10	7.99	NO DATA	0.31	1010.93			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(kg/kg)	(mbar)	(mbar)	(Kelvin)
0.35	11.055	12.841	13.021	8.659E-03	6.551E-03	10.594	13.707	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(kg/kg)	(mbar)	(mbar)	(Kelvin)
7.04	11.942	12.956	13.046	9.107E-03	6.604E-03	10.690	13.813	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080730  
START TIME: 7:38:50 PST  
START DATE: 8 May 1979 (DAY 178)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable)	MOMENTUM FLUX (Nt/m <sup>2</sup> )	FRICTION VELOCITY (meters/sec)	GENERAL FORM: $DN/DZ = (N1-N2)/[1 + \ln(Z1/Z2)]$	GENERAL FORM: $N/SLOPE = [(\ln Z1 - \ln Z2) - (\ln Z2 - \ln Z1)] / (N1 - N2)$
0.018 AT GMH	-1.32E-01	5.277E-01		
GEOMETRIC MEAN HEIGHT (meter) $GMH = (Z1+Z2)/2$	HUMIDITY FLUX (kg/sec m <sup>2</sup> )	SCALING SPEC. HUMID. (kg/kg)	N-WIND SPEED (m/sec) Z-HEIGHT (meters) $DWS/DZ = 5.85E-02$	N-WIND SPEED (m/sec) Z-HEIGHT (m) Vert Axis PSI+PS11 WS SLOPE = 1.20E-00
12.99	2.65E-05	6.559E-03		
Z/L AT GMH	LAT. HEAT FLUX (Watts/m <sup>2</sup> )	SCALING POT. TEMP. (Kelvin)	N-SPEC HUMIDITY (kg/kg) Z-HEIGHT (meters) $DSH/DZ = -8.92E-04$	N-SPEC HUMIDITY (kg/kg) Z-HEIGHT (m) Vert Axis PS1+PS12 SH SLOPE = -8.24E-03
-0.023	6.14E-01	1.308E-02		
Z/L AT 10 METERS	SHN. HEAT FLUX (Watts/m <sup>2</sup> )	ROUGHNESS LENGTH (meters)	N-POT. TEMP. (Kelvin) Z-HEIGHT (meters) $DPT/DZ = -1.79E-03$	N-POT. TEMP. (Kelvin) Z-HEIGHT (m) Vert Axis PS1+PS12 PTR SLOPE = -4.14E-01
-0.018	5.33E-00	1.100E-04		
Z/L AT Z1	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> )	DRAG COEF. AT 10 METERS (Dimensionless)		
-0.052	2.62E-02	1.404E-03		
Z/L AT Z2	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> )			
0.016	-1.91E-03			
ROUGHNESS LENGTH (meters)				
-5.714E-02				
PS11 AT Z1 = 0.105494	ROUGHNESS RATIO (no units)			
PS11 AT Z2 = 0.056300	0.001			
PS12 AT Z1 = 0.065483				
PS12 AT Z2 = 0.034402				

## \* GENERAL CONSTANTS:

GRAV. CONST.	GRAVITATION	PRANDTL	PRANDTL	BULK	BULK
(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )	NUMBER	NUMBER	TRANS. COEF.	TRANS. COEF.
9.8	9.8	0.71	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.206

## \* GENERAL NOTES:

Accuracy limitation recorded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SHI SLOPE = 1.00E-03 kg/kg

AIR SPECIFIC HEAT  
(J/kg K)  
1.014E-02  
WATER LAT. HEAT CAP  
(J/kg K)  
4.186E-01

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NAVAL RESEARCH LAB WASHINGTON DC

F/6 4/2

THE DATA BASE FOR THE MAY 1979 MARINE SURFACE LAYER MICROMETEOR--ETC(U)

MAY 82 T V BLANC

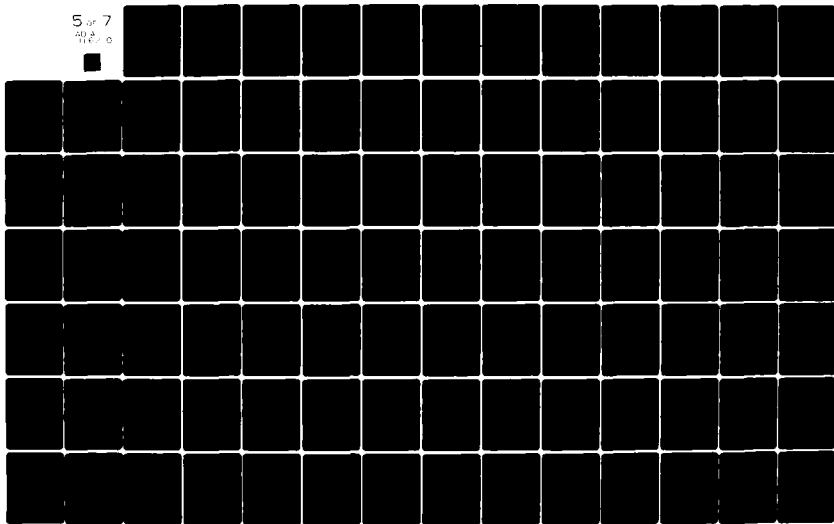
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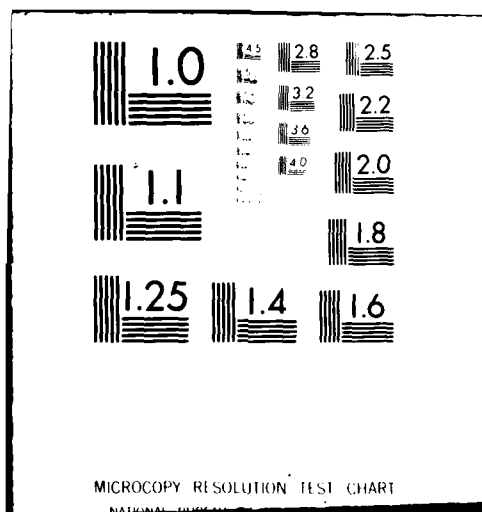
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RUN NUMBER: 7905086730  
 START TIME: 7:38:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.799	9.16	7.98	NO DATA	1010.83	13.577	-1.777	-1.679	-0.634	-0.536

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.30	11.897	12.942	13.040	8.121E-03	77.39	6.597E-03	10.679	13.800	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.073 AT GMM	MOMENTUM FLUX (Nt/m2) -1.28E-01	FRICTION VELOCITY (Meter/sec) 3.220E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.037E-01	AIR DENSITY (Kg/m3) 1.2309
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.37E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.102E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.368E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMM -0.034	LAT. HEAT FLUX (Watts/m2) 1.08E 02	SCALING POT. TEMP. (Kelvin) -5.018E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.616E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9064E 05
Z/L AT 10 METERS -0.067	SEN. HEAT FLUX (Watts/m2) 2.01E 01	ROUGHNESS LENGTH (Meters) 1.039E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.524
MONIN-OBUKHOV LENGTH (Meters) -1.502E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.62E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.235E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.34E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.03
	BOWEN RATIO (no units) 0.186			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
150%	150%	117%	167%	117%	5%	33%	283%	58%	108%	59%	78%	117%
160%	160%	46%	39%	88%	5%	12%	127%	23%	62%	111%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080730  
 START TIME: 7:38:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.044 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.29E-01 [6.0E-02]	FRICTION VELOCITY (Meter/sec) 3.236E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.04E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.394E-05 [3.0E-05]
Z/L AT GMM -0.054 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.99E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.590E-02 [2.0E-02]
Z/L AT 10 METERS -0.041 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.38E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.064E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.424E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.62E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.278E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.42E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.154 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
62%	59%	2%	25%	54%	0%	21%	36%	1%	25%	75%	3%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080800  
START TIME: 8: 8:50 PST  
END TIME: 8:39: 0 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.724	4.805	5.088	4.979	4.672	4.213	4.876
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
3.978	3.785	2.541	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 119882	1421 121038	0.183	91	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kel.xM-2/3)
11.988	9.79	7.90	NO DATA	310.8	1009.89	-5.87E 02	13.621	285.206
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.104	9.30	8.01	NO DATA	0.26	1010.99			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.168	13.126	13.306	8.067E-03	76.04	6.564E-03	10.616	13.960	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.194	13.251	13.341	8.131E-03	76.02	6.612E-03	10.704	14.082	NO DATA

## \* CONTINUED BFLOW

RUN NUMBER: 7905080800  
START TIME: 8: 8:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	ALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.032 AT GMH	MOMENTUM FLUX (Nt/m2) -1.29E-01	FRICTION VELOCITY (Meters/sec) 3.233E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1*Z2)^(1/2)	GENERAL FORM: N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)] / [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 2.68E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.752E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 5.52E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.24E 00
Z/L AT GMH -0.040	LAT. HEAT FLUX (Watts/m2) 6.64E 01	SCALING POT. TEMP. (Kelvin) -2.188E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.81E 03
Z/L AT 10 METERS -0.031	SEN. HEAT FLUX (Watts/m2) 8.79E 00	ROUGHNESS LENGTH (Meters) 1.056E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -2.89E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.47E 01
Z/L AT Z1 -0.037	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.87E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.316E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTR SLOPE=NO DATA
Z/L AT Z2 -0.029	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.12E 02			
MONIN-OBUKHOV LENGTH (Meters) -3.219E 02	BOWEN RATIO (no units) 0.132			
PSI1 AT Z1 = 0.172918 PSI1 AT Z2 = 0.095258 PSI2 AT Z1 = 0.109868 PSI2 AT Z2 = 0.058855				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08F-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2294

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4147E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9050E 03

RUN NUMBER: 7905080800  
 START TIME: 8: 0:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U.POT-WT TEMP (Kelvin)
12.098	9.36	8.00	NO DATA	1010.89	13.621	-1.531	-1.433	-0.386	-0.288

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.188	13.236	13.334	8.124E-03	76.02	6.606E-03	10.694	14.068	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.059 AT GMH	MOMENTUM FLUX (Nt/m2) -1.34E-01	FRICTION VELOCITY (Meters/sec) 3.306E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.093E-01	AIR DENSITY (Kg/m3) 1.2297
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.58E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.107E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.498E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMH -0.071	LAT. HEAT FLUX (Watts/m2) 1.11E 02	SCALING POT. TEMP. (Kelvin) -4.338E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.434E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9848E 05
Z/L AT 10 METERS -0.055	SEN. HEAT FLUX (Watts/m2) 1.78E 01	ROUGHNESS LENGTH (Meters) 1.143E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.570
MONIN-OBUKHOV LENGTH (Meters) -1.834E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.87E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.248E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.58E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.09
	BOWEN RATIO (no units) 0.160			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
139%	139%	125%	171%	101%	5%	18%	272%	62%	108%	39%	82%	125%
165%	165%	46%	39%	93%	5%	8%	132%	23%	62%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080800  
 START TIME: 8: 0:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.044 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.33E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.286E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.16E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.496E-05 [3.0E-05]
Z/L AT GMH -0.054 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.03E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.732E-02 [2.0E-02]
Z/L AT 10 METERS -0.042 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.35E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.113E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.393E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.87E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 1.264E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.75E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.151 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
38%	28%	2%	24%	33%	0%	6%	10%	1%	24%	44%	4%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080830  
START TIME: 8:39:10 PST  
END TIME: 9:10 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.639	4.730	5.933	5.772	4.668	5.077	4.815

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.027	3.815	2.545	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123114	1421 124396	0.157	99	-0.008	-0.050	0.000	0.993	0.959

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.)0.005V	B(No.)0.005V	(No.)0.002V	(No.)5V	(No.)1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.311	11.42	7.39	NO DATA	308.7	1009.03	-7.08E 02	13.669	285.535

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.440	10.83	7.56	NO DATA	0.18	1010.93

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.491	13.412	13.592	7.782E-03	71.90	6.339E-03	10.253	14.259	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.530	13.553	13.643	7.879E-03	72.14	6.414E-03	10.384	14.396	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080830  
START TIME: 8:39:10 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGFR,1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.33 AT GKH	MOMENTUM FLUX (Nt/m2) -1.86E-01	FRICTION VELOCITY (Meters/sec) 3.887E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1*Z2)^(1/2)]	GENERAL FORM: N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GKH=(Z1+Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 3.27E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.765E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 6.62E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE = 1.03E 00
Z/L AT GKH -0.042	LAT.HEAT FLUX (Watts/m2) 7.91E 01	SCALING POT. TEMP. (Kelvin) -3.255E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE = -7.99E 03
Z/L AT 10 METERS -0.032	SEN.HEAT FLUX (Watts/m2) 1.57E 01	ROUGHNESS LENGTH (Meters) 2.027E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ = -4.29E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTR SLOPE = -1.66E 01
Z/L AT Z1 -0.077	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.08E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.359E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.029	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.12E 02			
MONIN-OBUKHOV LENGTH (Meters) -3.125E 02	BOWEN RATIO (no units) 0.197			
PSI1 AT Z1 = 0.177204 PSI1 AT Z2 = 0.097818 PSI2 AT Z1 = 0.111670 PSI2 AT Z2 = 0.060478				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2281

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4138E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9031E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SM1-SM2- +/- .00F-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905080830  
 START TIME: 8:39:10 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.424	10.90	7.54	NO DATA	1010.83	13.669	-1.245	-1.147	-0.133	-0.035

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.522	13.536	13.634	7.867E-03	72.11	6.405E-03	10.369	14.380	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.030 AT GMM	MOMENTUM FLUX (Nt/m2) -1.97E-01	FRICTION VELOCITY (Meters/sec) 4.003E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.604E-01	AIR DENSITY (Kg/m3) 1.2283
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.66E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.150E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.657E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4130E 02
Z/L AT GMM -0.037	LAT. HEAT FLUX (Watts/m2) 1.40E 02	SCALING POT. TEMP. (Kelvin) -3.371E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.350E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9029E 05
Z/L AT 10 METERS -0.029	SEN. HEAT FLUX (Watts/m2) 1.68E 01	ROUGHNESS LENGTH (Meters) 2.249E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.618
MONIN-OBUKHOV LENGTH (Meters) -3.467E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.08E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.350E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.51E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.03
	BOWEN RATIO (no units) 0.120			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
126%	126%	120%	168%	88%	5%	17%	256%	60%	108%	28%	80%	120%
174%	174%	46%	38%	102%	5%	8%	140%	23%	61%	125%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080830  
 START TIME: 8:39:10 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.032 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.94E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.972E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.21E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.784E-05 [3.0E-05]
Z/L AT GMM 0.040 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.29E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.276E-02 [2.0E-02]
Z/L AT 10 METERS -0.031 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.62E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.171E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -3.260E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.08E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.352E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.70E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.147 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
5%	5%	3%	28%	3%	0%	6%	27%	2%	25%	2%	5%	0%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080900  
START TIME: 9: 9:20 PST  
END TIME: 9:39:30 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.645	4.737	6.269	6.051	4.675	5.687	4.896

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
4.055	3.778	2.548	0.001	0.001	0.001	0.001	6.295

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WSIEC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124451	1421 125860	0.183	104	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.445	12.06	7.43	NO DATA	311.5	1009.94	-7.93E 02	13.696	285.676

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.586	11.26	7.60	NO DATA	0.08	1011.04

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.625	13.549	13.728	7.798E-03	71.44	6.354E-03	10.278	14.387	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.676	13.703	13.793	7.897E-03	71.64	6.431E-03	10.414	14.536	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905080900  
START TIME: 9: 9:20 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) -0.025 AT GMM	MOMENTUM FLUX (Nt/m2) -3.15E-01	FRICITION VELOCITY (Meters/sec) 5.067E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[Ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 4.14E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.657E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 8.84E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 7.89F-01
Z/L AT GMM -0.031	LAT.HEAT FLUX (Watts/m2) 1.02E 02	SCALING POT. TEMP. (Kelvin) -4.257E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -8.12E 03
Z/L AT 10 METERS -0.024	SEN.HEAT FLUX (Watts/m2) 2.68E 01	ROUGHNESS LENGTH (Meters) 5.034E-04	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -5.70E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -1.27E 01
Z/L AT Z2 -0.022	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.93E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.055E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) -4.137E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.64E 02			
PSI1 AT Z1= 0.140021 PSI1 AT Z2= 0.075910 PSI2 AT Z1= 0.087498 PSI2 AT Z2= 0.046651	BOWEN RATIO (no units) 0.262			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR.PRANDTL NUMBER 0.74	PROFILE TUR.SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF.COEF. 0.92E-03	BULK MOISTURE TRANSF.COEF. 1.32E-03
---	--	--	--	--	--

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2276

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .00E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4130E 02

WATER LAT.HEAT VAP.  
(J/cal./Kg)  
5.9024E 05

RUN NUMBER: 7905080900  
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MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.569	11.36	7.50	NO DATA	1010.94	13.696	-1.127	-1.029	-0.012	0.086

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.667	13.685	13.783	7.887E-03	71.62	6.422E-03	10.398	14.519	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.024 AT GMH	MOMENTUM FLUX (Nt/m2) -2.19E-01	FRICTION VELOCITY (Meters/sec) 4.219E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.780E-01	AIR DENSITY (Kg/m3) 1.2276
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.90E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.139E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.899E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4139E 02
Z/L AT GMH -0.030	LAT. HEAT FLUX (Watts/m2) 1.46E 02	SCALING POT. TEMP. (Kelvin) -3.023E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.275E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9021E 05
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 1.58E 01	ROUGHNESS LENGTH (Meters) 2.694E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.647
MONIN-OBUKHOV LENGTH (Meters) -4.293E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.93E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.380E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.102E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.32E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.14
	BOWEN RATIO (no units) 0.109			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
98%	98%	94%	152%	68%	5%	18%	221%	47%	106%	21%	67%	94%
179%	179%	46%	38%	107%	5%	7%	145%	23%	61%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080900  
 START TIME: 9: 9:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -2.50E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.498E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.55E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.85E-05 [3.0E-05]
Z/L AT GMH -0.031 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.37E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -4.083E-02 [2.0E-02]
Z/L AT 10 METERS -0.024 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.25E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.610E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.191E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.93E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.582E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.41E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.169 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
2%	2%	20%	18%	25%	0%	3%	44%	10%	25%	19%	33%	23%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905080930  
START TIME: 9:39:40 PST  
END TIME: 10:09:50 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	4.630	4.723	6.363	6.114	4.668	6.268	4.938

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.081	3.769	2.548	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WSIEC	WS2CC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 125765	1421 127315	0.183	112	-0.008	-0.050	0.000	0.992	0.972

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BA-	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 0.005V)	B(No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.77

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.577	12.24	7.14	NO DATA	312.9	1009.83	-8.74E 02	13.721	285.814

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.731	11.38	7.52	NO DATA	-0.04	1010.93

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.755	13.674	13.854	7.747E-03	70.40	6.316E-03	10.216	14.510	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AIR HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.822	13.843	13.933	7.847E-03	70.56	6.395E-03	10.354	14.674	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905080930  
START TIME: 9:39:40 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSERING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.027 AT GMM	MOMENTUM FLUX (Nt/m2) -3.73E-01	FRICTION VELOCITY (Meters/sec) 5.517E-01	GENERAL FORM: DN/DZ= [(N1-N2)]/[ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N/SLOPE= [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.97	HUMIDITY FLUX (Kg/sec m2) 4.53E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.687E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 9.56E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.25E-01
Z/L AT GMM -0.034	LAT. HEAT FLUX (Watts/m2) 1.12E 02	SCALING POT. TEMP. (Kelvin) -5.436E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.0HF 03
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 3.73E 01	ROUGHNESS LENGTH (Meters) 6.675E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -7.28E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -9.91E 00
Z/L AT Z1 -0.043	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.74E 02	DRAW COEF. AT 10 METERS (Dimensionless) 2.360E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.024	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.25E 02			
MONIN-BRUKHOV LENGTH (Meters) -3.839E 02	BOWEN RATIO (no units) 0.334			
PSI1 AT Z1= 0.150229 PSI1 AT Z2= 0.081858 PSI2 AT Z1= 0.094103 PSI2 AT Z2= 0.050390				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 +/- 0.0RF-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2269

AIR SPECIFIC HEAT  
(J/Kelvin)  
2.4137E 02

WATER LAT. HEAT VAP.  
(J/Kelvin)  
5.9018E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905080930  
 START TIME: 9:39:40 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT. TEMP. (Celsius)	AIR-WT. TEMP. (Kelvin)	POT-WT. TEMP. (Kelvin)	VIR-WT. TEMP. (Kelvin)	V.POT-WT. TEMP. (Kelvin)
12.713	11.48	7.50	NO DATA	1010.83	13.721	-1.009	-0.911	0.101	0.199

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.811	13.823	13.921	7.835E-03	70.54	6.385E-03	10.337	14.655	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.021 AT GMH	MOMENTUM FLUX (Nt/m2) -2.25E-01	FRICTION VELOCITY (Meters/sec) 4.277E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.830E-01	AIR DENSITY (Kg/m3) 1.2271
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.06E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.155E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.064E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4138E 02
Z/L AT GMH -0.026	LAT. HEAT FLUX (Watts/m2) 1.50E 02	SCALING POT. TEMP. (Kelvin) -2.716E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.162E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9012E 05
Z/L AT 10 METERS -0.020	SEN. HEAT FLUX (Watts/m2) 1.44E 01	ROUGHNESS LENGTH (Meters) 2.825E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.671
MONIN-OBUKHOV LENGTH (Meters) -4.914E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.74E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.388E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.184E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.10E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.03
	BOWEN RATIO (no units) 0.096			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
89%	89%	88%	149%	61%	5%	17%	210%	44%	105%	17%	64%	88%
185%	185%	46%	38%	113%	5%	7%	151%	23%	61%	136%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905080930  
 START TIME: 9:39:40 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN I I:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.76E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.784E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.75E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -9.761E-05 (3.0E-05)
Z/L AT GMH -0.032 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.42E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -5.144E-02 (2.0E-02)
Z/L AT 10 METERS -0.024 (0.02)	SEN. HEAT FLUX (Watts/m2) 2.93E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.376E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.110E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.74E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.693E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.14E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.195 (0.081)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
13%	13%	28%	16%	41%	0%	1%	62%	14%	26%	34%	45%	31%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081230  
START TIME: 12:30: 0 PST  
END TIME: 12:59:50 PST  
START DATE: 8 May 1979 (DAY 12H)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL.T.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.520	4.626	8.306	7.688	4.632	7.109	4.970
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL.T.REF.H		
4.262	3.837	2.544	0.001	0.001	0.991	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTRFCAL	WS1LC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 126479	1421 127145	0.183	147	-0.998	-0.050	0.000	0.992	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL.T.REF.DEV	VOL.T.REF.DEV	ZERO REF.DEV	AC VOL.T.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.)	B(No.)	(No.)	(No.)	(No.)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.84

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.648	15.95	6.69	NO DATA	314.0	1009.27	-9.91E 02	13.898	285.841
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.715	14.27	6.94	NO DATA	-0.54	1010.37			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.828	13.697	13.877	7.400E-03	66.99	6.037E-03	9.761	14.570	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.805	13.793	13.873	7.538E-03	67.88	6.145E-03	9.945	14.650	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081230  
START TIME: 12:30: 0 PST  
START DATE: 8 May 1979 (DAY 12H)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+=Stable, -=Unstable) 0.002 AT GHM	MOMENTUM FLUX (Nt/m2) -1.13E 00	FRICTION VELOCITY (Meters/sec) 9.613E-01	GENERAL FORM: DN/DZ= [ (N1-N2) ] / [ (ln(Z1/Z2)) <sup>2</sup> ]	GENERAL FORM: N'SLOPE= [ (LnZ1-PS1) - (LnZ2-PS1) ] / (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec.m2) 9.71E-03	SCALING SPEC.HUMID. (Kg/Kg) -8.24E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.88E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PS1=PS11 WS SLOPE= 4.16E-01
Z/L AT GHM 0.003	LAT.HEAT FLUX (Watts/m2) 2.40E 02	SCALING POT. TEMP. (Kelvin) 1.765E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -1.20E-05	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PS1=PS12 SH SLOPE= -6.56E 03
Z/L AT 10 METERS 0.003	SEN.HEAT FLUX (Watts/m2) -2.10E 01	ROUGHNESS LENGTH (Meters) 2.964E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= 2.57E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PS1=PS12 PTK SLOPE= 3.06E 01
Z/L AT Z1 0.005	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.91E 02	DRAG COEF. AT 10 METERS (Dimensionless) 4.067E-03		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.002	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.72E 02			
MONIN-ORUKHOV LENGTH (Meters) 3.835E 03	BOWEN RATIO (no units) -0.088			
PS11 AT Z1= -0.022489 PS11 AT Z2= -0.011275 PS12 AT Z1= -0.030390 PS12 AT Z2= -0.015237				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SEN HEAT TRANSF.COEF.	BULK MOISTURE TRANSF.COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2263
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4137E 02
WATER LAT.HEAT VAP. (ITcal./Kg) 5.9014E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081230  
 START TIME: 12:30: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kel./m-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U.POT-WT TEMP (Kelvin)
12.707	14.47	6.91	NO DATA	1010.27	13.898	-1.191	-1.093	-0.125	-0.027

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kel./m-2/3)
10.00	12.805	13.772	13.670	7.521E-03	67.78	6.132E-03	9.923	14.641	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERR'D STABILITY	FLUX PARAMETERS (*UP,-DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (*Stable,-Unstable) -0.012 AT GHM	MOMENTUM FLUX (Nt/m2) -4.07E-01	FRICTION VELOCITY (Meters/sec) 5.761E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.318E-01	AIR DENSITY (Kg/m3) 1.2266
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.48E-05	SCALING SPEC.HUMID. (Kg/Kg) -1.208E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.476E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4137E 02
Z/L AT GHM -0.015	LAT.HEAT FLUX (Watts/m2) 2.09E 02	SCALING POT.TEMP. (Kelvin) -2.873F-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.655E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9013E 05
Z/L AT 10 METERS -0.012	SFN.HEAT FLUX (Watts/m2) 2.05F 01	ROUGHNESS LENGTH (Meters) 7.685E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.843
MONIN-OBUKHOV LENGTH (Meters) -8.426E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.91E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.585E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.196E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.61E 02			BAR.PRES.AT WT LEVEL (Millibar) 1011.47
	BOWEN RATIO (no units) 0.098			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
85%	87%	59%	108%	69%	5%	21%	177%	30%	79%	39%	50%	59%
176%	176%	46%	37%	104%	5%	8%	141%	23%	60%	127%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081230  
 START TIME: 12:30: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (*UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (*Stable,-Unstable) -0.002 [0.02] AT GHM	MOMENTUM FLUX (Nt/m2) -7.25E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 7.448F-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.79E-05 [9.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -1.037E-04 [3.0E-05]
Z/L AT GHM -0.003 [0.02]	LAT.HEAT FLUX (Watts/m2) 2.17E 02 [2.0E+01]	SCALING POT.TEMP. (Kelvin) 6.709E-03 [2.0E-02]
Z/L AT 10 METERS -0.002 [0.02]	SFN.HEAT FLUX (Watts/m2) -4.48F 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.789E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -4.375E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.91E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meter-) 2.588E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.64E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.016 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SFN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL.SPEC HUMIDITY	SCAL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
38%	38%	50%	8%	473%	0%	1%	117%	26%	18%	131%	62%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905081300  
START TIME: 13:00 PST  
END TIME: 13:30:11 PST  
START DATE: 8 May 1979 (DAY 120)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMINATOR: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE MODE):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	4.489	4.605	8.789	8.054	4.620	6.843	4.924
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPACE A	SPACE B	VOL. REF. B		
4.260	4.796	2.045	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP/FCA	DP/FCA	WIND CAL	WIND	WIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.176576	1421.127571	0.183	148	0.008	-0.050	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOL. REF. DEW	VOL. REF. DEW	ZERO REF. DEW	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.005V)	(No. 1.005V)	(No. 1.005V)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.80

## \* DERIVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.690	15.87	6.50	NO DATA	512.4	1009.10	9.54E-02	14.896	285.683
AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP. STRUC. 2	TIDE GAUGE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
12.757	14.94	6.82	NO DATA	-0.50	1010.20			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.869	13.725	13.905	7.363E-03	65.95	5.939E-03	9.634	14.607	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.29	12.847	13.816	13.906	7.471E-03	67.11	6.092E-03	9.858	14.688	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 2905081300  
START TIME: 13:00 PST  
START DATE: 8 May 1979 (DAY 120)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMINATOR: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
LEAD RICHARDSON NUMBER (+Stable, -Unstable) 0.002 AT GMH	MOMENTUM FLUX (Nt/m2) -1.51E-06	FRICTION VELOCITY (Meters/sec) 1.110E-00	GENERAL FORM: $DN/DZ = (N1-N2)/(1/n(Z1/Z2)^{1/2})$	GENERAL FORM: $N SLOPE = (LnZ1-PS1) - (LnZ2-PS1)/(LnZ1-PS1)$
GEOMETRIC MEAN HEIGHT (Meter) GMH = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.37E-04	SCALING SPEC. HUMID. (Kg/Kg) -1.020E-04	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 2.16E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 3.60E-01
Z/L AT GMH 0.002	LAT. HEAT FLUX (Watts/m2) 3.43E-02	SCALING POT. TEMP. (Kelvin) 1.704E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -1.48E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -5.30E-03
Z/L AT Z1 0.003	SEN. HEAT FLUX (Watts/m2) -2.34E-01	ROUGHNESS LENGTH (Meters) 3.552E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 2.47E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 3.17E-01
Z/L AT Z2 0.002	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.54E-02	DRAW COEF. AT 10 METERS (Dimensionless) 4.815E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
ROUGHNESS LENGTH (Meters) 5.192E-03	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.35E-02			
PS11 AT Z1 = 0.016283 PS11 AT Z2 = 0.008104 PS12 AT Z1 = 0.022064 PS12 AT Z2 = 0.011032	ROWIN RATIO (no unit) -0.648			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL NUMBER	PROF. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2260

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4130E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9012E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081300  
 START TIME: 13: 0: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.749	15.17	6.78	NO DATA	1010.10	13.896	-1.147	-1.049	-0.091	0.007

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xm-2/3)
10.00	12.847	13.805	13.903	7.450E-03	66.97	6.076E-03	9.831	14.679	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 AT GMH	MOMENTUM FLUX (Nt/m2) -4.60E-01	FRICTION VELOCITY (Meter/sec) 6.127E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.754E-01	AIR DENSITY (Kg/m3) 1.2263
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.02E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.201E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.02E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4131E-02
Z/L AT GMH -0.013	LAT. HEAT FLUX (Watts/m2) 2.23E-02	SCALING POT. TEMP. (Kelvin) -2.716E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.664E-02	WATER LAT. HEAT VAP. (Jtcal./Kg Kel.) 5.9010E-05
Z/L AT 10 METERS -0.010	SEN. HEAT FLUX (Watts/m2) 2.04E-01	ROUGHNESS LENGTH (Meters) 9.356E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.839
MONIN-OBUKHOV LENGTH (Meters) -1.008E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.54E-02	DRAG COEF. AT 10 METERS (Dimensionless) 1.631E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.196E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.11E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.30
	BOWEN RATIO (no units) 0.092			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP	ROUGH LENGTH	DRAG COEF
82%	84%	54%	92%	68%	5%	24%	159%	27%	65%	40%	47%	54%
178%	179%	46%	37%	106%	5%	8%	143%	23%	60%	129%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081300  
 START TIME: 13: 0: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.002 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -9.41E-01 (6.0E-02)	FRICTION VELOCITY (Meter/sec) 8.405E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.79	HUMIDITY FLUX (Kg/sec m2) 1.04E-04 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -1.114E-04 (3.0E-05)
Z/L AT GMH -0.002 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.57E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 6.477E-03 (2.0E-02)
Z/L AT 10 METERS -0.002 (0.02)	SEN. HEAT FLUX (Watts/m2) -6.24E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.183E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.293E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.54E-02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 2.980E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.94E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.017 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ARBITRARY VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP	ROUGH LENGTH	DRAG COEF
31%	31%	56%	25%	361%	0%	6%	101%	30%	8%	175%	60%	54%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081330  
START TIME: 13:30:20 PST  
END TIME: 14: 0:30 PST  
START DATE: 8 May 1979 (DAY 179)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.486	4.597	9.139	8.510	4.610	6.443	4.965
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQ. FLUX	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.246	3.931	2.546	0.001	0.001	0.001	0.001	6.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPTICAL	DPTFCAL	WTFICAL	WSIFC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH(METERS)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 127216	1421 127602	0.183	146	-0.008	-0.050	0.000	0.992	0.950

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.5	59.83

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.722	17.54	6.48	NO DATA	312.6	1009.93	-0.91E 02	13.682	285.901
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.760	15.77	6.71	NO DATA	-0.5	1010.63			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.901	13.756	13.936	7.292E-03	65.74	5.953E-03	9.621	14.636	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.850	13.811	13.901	7.414E-03	66.60	6.046E-03	9.783	14.687	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081330  
START TIME: 13:30:20 PST  
START DATE: 8 May 1979 (DAY 179)

MARINE SURFACE LAYER  
NRL MICROMETEORLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (RUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.005 AT GMM	MOMENTUM FLUX (Nt/m2) -1.21E 00	FRICTION VELOCITY (Meters/sec) 9.933E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2)) + (Z1#Z2)]/Z1	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.54E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.034E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.97E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 4.03E-01
Z/L AT GMM 0.087	LAT. HEAT FLUX (Watts/m2) 2.12E 02	SCALING POT. TEMP. (Kelvin) 3.824E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -1.05E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -7.61E 03
Z/L AT 10 METERS 0.005	SEN. HEAT FLUX (Watts/m2) -4.70E 01	ROUGHNESS LENGTH (Meters) 3.124E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 5.69E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 1.41E 01
Z/L AT Z1 0.010	SKY AND SOLAR HEAT FLUX (Watts/m2) -R.98E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 3.553E-05		N=LnTEMP. STRUCT. (K-M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CTR SLOPE=NO DATA
Z/L AT Z2 0.005	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.34E 02			
MONIN-BRUKHUIV LENGTH (Meters) 1.991E 03	BOWEN RATIO (no units) -0.222			
PSI1 AT Z1 = -0.045600 PSI1 AT Z2 = -0.022862 PSI2 AT Z1 = -0.061622 PSI2 AT Z2 = -0.030895				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2257
AIR SPECIFIC HEAT (J/Kel. /Kg Kel.) 2.4130E 02
WATER LAT. HEAT VAP (J/Kel. /Kg) 5.9011E 05

RUN NUMBER: 7905081330  
 START TIME: 13:30:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. m-2/3)	HAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WI TEMP (Kelvin)	POT-WI TEMP (Kelvin)	VIR-WI TEMP (Kelvin)	V.POT-WI TEMP (Kelvin)
12.756	15.99	6.68	NO DATA	1009.94	13.882	-1.127	-1.029	-0.078	0.020

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. m-2/3)
10.00	12.854	13.805	13.903	7.400E-03	66.50	6.035E-03	9.764	14.683	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.008 AT 10M	MOMENTUM FLUX (Nt/m2) -5.28E-01	FRICTION VELOCITY (Meters/sec) 6.563E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.307E-01	AIR DENSITY (Kg/m3) 1.2261
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.59E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.192E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.590E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4130E 02
Z/L AT 10M -0.011	LAT. HEAT FLUX (Watts/m2) 2.37E 02	SCALING POT. TEMP. (Kelvin) -2.610E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.713E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9010E 05
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 2.12E 01	ROUGHNESS LENGTH (Meters) 1.157E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.822
MONIN-OBUKHOV LENGTH (Meters) -1.204E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.98E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.685E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.194E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.40E 02			HAR. PRES. AT WT LEVEL (Millibar) 1011.14
	BOWEN RATIO (no units) 0.090			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-%":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
68%	72%	60%	119%	49%	5%	22%	168%	30%	89%	19%	50%	60%
179%	179%	46%	37%	107%	5%	9%	143%	23%	60%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081330  
 START TIME: 13:30:20 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.001 [0.07] AT 10M	MOMENTUM FLUX (Nt/m2) -8.23E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.024E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.35E-05 [0.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.954E-05 [3.0E-05]
Z/L AT 10M 0.902 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.31E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 2.986E-02 [2.0E-02]
Z/L AT 10 METERS 0.001 [0.02]	SEN. HEAT FLUX (Watts/m2) -2.54E 01 [5.0E+00]	ROUGHNESS LENGTH (Meters) 2.066E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 7.187E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.98E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.431E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.67E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.054 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-%":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
36%	37%	47%	6%	143%	0%	8%	196%	21%	25%	134%	48%	34%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 77050R1400  
START TIME: 14: 04:00 PST  
END TIME: 14:30:50 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT REF A	TEMP. STRUC.1	TEMP. STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	4.430	4.535	9.095	8.314	4.614	5.937	5.074

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT REF. B
4.237	4.934	2.547	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DPTFCAL	DP2FCAL	WD2FCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128387	1421 128648	0.183	141	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.93

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP. STRUC.1	WIND DIR.	BAR. PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.819	17.46	6.15	NO DATA	317.5	1009.00	-8.20E 02	13.873	286.012

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP. STRUC.2	TIDE TABLE	BAR. PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.865	15.41	6.40	NO DATA	-0.46	1010.10

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	UTR. TEMP.1	V. POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.019	13.850	14.030	7.123E-03	63.74	5.816E-03	9.401	14.750	NO DATA

HEIGHT, Z2	POT. TEMP.2	UTR. TEMP.2	V. POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.28	12.955	13.694	13.985	7.259E-03	64.78	5.921E-03	9.582	14.791	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 77050R1400  
START TIME: 14: 04:00 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEORLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.005 AT GMM	MOMENTUM FLUX (N/m2) -1.62E 00	FRICTION VELOCITY (Meters/sec) 1.151E 00	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$	GENERAL FORM: $N/SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.12E-04	SCALING SPEC. HUMID. (Kg/Kg) -7.932E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.28E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 3.48E-01
Z1 AT GMM 0.006	LAT. HEAT FLUX (Watts/m2) 2.76E 02	SCALING POT. TEMP. (Kelvin) 4.782E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -1.18E-05	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -6.81E 03
Z2 AT 10 METERS 0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) 0.28E 02	ROUGHNESS LENGTH (Meters) 3.637E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 7.09E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTR SLOPE= 1.13E 01
PUNTIN DECKHOU LENGTH (Meters) 2.12E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.20E 02	DRAW COEF. AT 10 METERS (Dimensionless) 4.814E-03	N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA	
U101 AT Z1 0.042500 U101 AT Z2 0.021398 U102 AT Z1 0.057433 U102 AT Z2 0.029295	BROWN RATIO (no units) -0.247			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) <th>GRAVITATION ACCELERATION (M/sec 2) <th>PRANDTL TUR. PRANDTL NUMBER <th>PROF. DIE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec 2) <th>PRANDTL TUR. PRANDTL NUMBER <th>PROF. DIE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PRANDTL TUR. PRANDTL NUMBER <th>PROF. DIE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROF. DIE TUR. SCHMIDT NUMBER <th>BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SEN HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

\* GENERAL NOTES:  
NONE

## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2254

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4127E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9005E 05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905081400  
 START TIME: 14: 0:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin x M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.862	15.66	6.37	NO DATA	1010.01	13.873	-1.012	-0.914	0.016	0.114

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin x M-2/3)
10.00	12.960	13.889	13.987	7.243E-03	64.66	5.908E-03	9.560	14.786	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GMH	MOMENTUM FLUX (Nt/m2) -5.00E-01	FRICTION VELOCITY (Meters/sec) 6.388E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.080E-01	AIR DENSITY (Kg/m3) 1.2258
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.71E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.240E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.707E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4129E 02
Z/L AT GMH -0.010	LAT. HEAT FLUX (Watts/m2) 2.40E 02	SCALING POT. TEMP. (Kelvin) -2.374E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.516E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9004E 05
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 1.88E 01	ROUGHNESS LENGTH (Meters) 1.065E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.814
MONIN-ORUKHOV LENGTH (Meters) -1.255E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.28E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.664E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.194E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.69E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.21
	BOWEN RATIO (no units) 0.078			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
58%	60%	51%	105%	41%	5%	25%	146%	26%	79%	16%	46%	51%
185%	185%	46%	37%	113%	5%	9%	149%	23%	60%	136%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081400  
 START TIME: 14: 0:40 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.002 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.03E 00 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.810E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.01E-04 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -1.040E-04 [3.0E-05]
Z/L AT GMH 0.002 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.49E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 4.041E-02 [2.0E-02]
Z/L AT 10 METERS 0.002 [0.02]	SEN. HEAT FLUX (Watts/m2) -4.48E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.313E-03 [6.0E-05]
MONIN-ORUKHOV LENGTH (Meters) 5.691E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.28E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 3.044E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.83E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.086 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
35%	36%	54%	8%	107%	0%	5%	109%	29%	22%	113%	56%	52%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081430  
START TIME: 14:31: 0 PST  
END TIME: 15: 1:10 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.488	4.580	8.890	8.095	4.612	5.347	5.078
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.231	3.946	2.552	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WT1FCAL	WT2FC	WT2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128462	1421 128619	0.193	135	-0.008	-0.050	0.000	0.992	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1.1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.85

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
17.846	17.07	6.50	NO DATA	317.7	1208.98	-7.46E-02	13.867	286.014
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.862	15.01	6.66	NO DATA	-0.36	1010.07			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	13.026	13.882	14.062	7.297E-03	65.27	5.959E-03	9.631	14.755	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.29	12.952	13.910	14.090	7.390E-03	65.96	6.029E-03	9.755	14.788	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081430  
START TIME: 14:31: 0 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.005 AT GMH	MOMENTUM FLUX (Nt/m2) -1.62E-00	FRICTION VELOCITY (Meters/sec) 1.151E-00	GENERAL FORM: DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(Ln Z1 - PSI1) - (Ln Z2 - PSI2)] / (N1 - N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 8.43E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.977E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) PSI-PSI1 DWS/DZ = 2.29E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WS SLOPE = 3.48E-01
Z/L AT GMH 0.007	LAT. HEAT FLUX (Watts/m2) 2.08E-02	SCALING POT. TEMP. (Kelvin) 5.527E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI-PSI2 SH SLOPE = -9.04E-03
Z/L AT 10 METERS 0.006	SEN. HEAT FLUX (Watts/m2) -7.87E-01	ROUGHNESS LENGTH (Meters) 3.637E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = 8.25E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI-PSI2 PTK SLOPE = 9.78E-00
Z/L AT Z1 0.010	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.46E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.051E-03		
Z/L AT Z2 0.005	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.16E-02			
MONIN-BUKHOV LENGTH (Meters) 1.757E-03	BOWEN RATIO (no units) -0.378			
PSI1 AT Z1 = -0.049098 PSI1 AT Z2 = -0.024616 PSI2 AT Z1 = -0.066349 PSI2 AT Z2 = -0.033265				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec^2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2253

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4179E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9804E-05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- .08E-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081430  
 START TIME: 14:31: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.860	15.26	6.64	NO DATA	1009.98	13.867	-1.007	-0.909	0.040	0.138

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.958	13.907	14.005	7.374E-03	65.88	6.020E-03	9.740	14.784	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.009 AT GMH	MOMENTUM FLUX (Nt/m2) -4.67E-01	FRICTION VELOCITY (Meters/sec) 6.175E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.813E-01	AIR DENSITY (Kg/m3) 1.2257
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.217E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.175E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4130E 02
Z/L AT GMH -0.011	LAT. HEAT FLUX (Watts/m2) 2.27E 02	SCALING POT. TEMP. (Kelvin) -2.391E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.477E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9004E 05
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 1.83E 01	ROUGHNESS LENGTH (Meters) 9.587E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.807
MONIN-OBUKHOV LENGTH (Meters) -1.164E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.46E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.637E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.193E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.01E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.18
	BOWEN RATIO (no units) 0.081			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
54%	57%	50%	128%	39%	5%	26%	166%	25%	103%	14%	45%	50%
185%	185%	46%	37%	113%	5%	9%	150%	23%	60%	136%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081430  
 START TIME: 14:31: 0 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.002 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.02E 00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.739E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.01E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -9.865E-05 (3.0E-05)
Z/L AT GMH 0.003 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.23E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 4.798E-02 (2.0E-02)
Z/L AT 10 METERS 0.002 (0.02)	SEN. HEAT FLUX (Watts/m2) -5.40E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.270E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 4.329E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.46E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.161E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.31E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.137 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
39%	40%	56%	5%	100%	0%	12%	168%	31%	32%	106%	59%	54%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 2905001500  
START TIME: 15:12:00 PST  
END TIME: 15:31:20 PST  
START DATE: 8 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLTS REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.205	0.001	0.001	4.577	4.670	8.786	8.055	4.606	4.686	5.053

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.023	3.776	2.548	0.001	0.001	0.001	0.001	6.285

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	DP/FCL	DP/FCL	WT/FCL	WS/FCL	WS/FCL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.1802	1421.1802	0.183	126	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(Hz)	(No. 0.005V)	(No. 0.005V)	(No. 0.002V)	(No. 15V)	(No. 1Hz)	(VAC)	(Hz)
0	0	183	0	0	0	0	0	115.5	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.805	16.87	7.03	NO DATA	216.8	1008.89	-6.53E-02	13.875	285.966

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.807	14.94	7.21	NO DATA	-0.24	1009.99

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.983	13.877	14.057	7.568E-03	67.88	6.180E-03	9.987	14.713	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.899	13.897	13.987	7.671E-03	60.70	6.258E-03	10.124	14.735	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 2905001500  
START TIME: 15:12:00 PST  
START DATE: 8 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 AT 6M	MOMENTUM FLUX (Nt/m2) -1.40E-00	FRICTION VELOCITY (Meters/sec) 1.070E-00	GENERAL FORM: DN/DZ= ((N1-N2))/(ln(Z1/Z2)) (Z1=Z2)1/2	GENERAL FORM: 'N' SLOPE= ((lnZ1-PSI)-(lnZ2-PSI))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.897E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.15E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 3.74E-01
Z/L AT 6M 0.010	LAT. HEAT FLUX (Watts/m2) 1.91E-02	SCALING POT. TEMP. (Kelvin) 6.152E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.16E-03
Z/L AT 10 METERS 0.007	SUN. HEAT FLUX (Watts/m2) -8.15E-01	ROUGHNESS LENGTH (Meters) 3.435E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 9.30E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 8.79E-00
Z/L AT Z2 0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.53E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 4.476E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN BRUKHUIJ LENGTH (Meters) 1.364E-03	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.44E-02			
PSI1 AT Z1= -0.863211 PSI1 AT Z2= -0.831692 PSI2 AT Z1= -0.885421 PSI2 AT Z2= -0.842827	BOWEN RATIO (no units) -0.427			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL TUR. PRANDTL NUMBER	PROFIE TUR. SCHMIDT NUMBER	BULK SUN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- 0.081-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2252
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4134E-02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9807E-05

RUN NUMBER: 7905081500  
 START TIME: 15: 1:20 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.808	15.17	7.1R	NO DATA	1009.89	13.875	-1.067	-0.969	0.020	0.118

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.996	13.895	13.993	7.659E-03	68.60	6.249E-03	10.107	14.733	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -4.60E-01	FRICTION VELOCITY (Meters/sec) 6.128E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.756E-01	AIR DENSITY (Kg/m3) 1.2256
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.57E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.141E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.570E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4135E 02
Z/L AT GMM -0.012	LAT. HEAT FLUX (Watts/m2) 2.12E 02	SCALING POT. TEMP. (Kelvin) -2.533E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.552E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9007E 05
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 1.92E 01	ROUGHNESS LENGTH (Meters) 9.361E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.814
MONIN-OBUKHOV LENGTH (Meters) -1.082E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.53E 02	DRAW COFF. AT 10 METERS (Dimensionless) 1.631E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.194E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.23E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.09
	BOWEN RATIO (no units) 0.091			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
56%	60%	52%	129%	39%	5%	27%	168%	26%	103%	13%	46%	52%
182%	192%	46%	37%	110%	5%	10%	147%	23%	60%	133%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081500  
 START TIME: 15: 1:20 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.003 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -9.01E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.266E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.38E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -9.376E-05 (3.0E-05)
Z/L AT GMM 0.004 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.07E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 5.393E-02 (2.0E-02)
Z/L AT 10 METERS 0.003 (0.02)	SEN. HEAT FLUX (Watts/m2) -5.51E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.141E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 3.088E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.53E 02 (2.0E+01)	DRAW COFF. AT 10 METERS (Meters) 2.863E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.55E 02 (3.0E+01)	
	BOWEN RATIO (no units) -0.150 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
45%	46%	52%	6%	101%	0%	15%	172%	28%	30%	104%	58%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081530  
START TIME: 15:31:30 PST  
END TIME: 16:14:00 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.520	4.606	9.647	9.012	4.597	4.074	5.138
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.220	3.796	2.548	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	W51EC	W52EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 128323	1421 127993	0.183	117	-0.008	-0.050	0.000	0.992	0.942

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. >.005V)	B (No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.832	18.51	6.68	NO DATA	319.7	1008.75	-5.69E 02	13.856	285.976
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. x M-2/3)	(Meter MSL)	(Millibar)			
12.799	16.69	6.82	NO DATA	-0.10	1009.85			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
18.35	13.012	13.882	14.062	7.390E-03	66.17	6.036E-03	9.753	14.740	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. x M-2/3)
9.20	12.889	13.859	13.949	7.470E-03	66.95	6.094E-03	9.858	14.724	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081530  
START TIME: 15:31:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (**UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (**INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (**Stable, -Unstable) 0.011 AT GMH	MOMENTUM FLUX (Nt/m2) -1.17E 00	FRICTION VELOCITY (Meters/sec) 9.789E-01	GENERAL FORM: DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.80E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.672E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.03E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 4.09E-01
Z/L AT GMH 0.016	LAT. HEAT FLUX (Watts/m2) 1.61E 02	SCALING POT. TEMP. (Kelvin) 8.701E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.53E 03
Z/L AT 10 METERS 0.012	SEN. HEAT FLUX (Watts/m2) -1.05E 02	ROUGHNESS LENGTH (Meters) 3.054E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 1.37E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 6.21E 00
Z/L AT Z2 0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.69E 02	DRAW COEF. AT 10 METERS (Dimensionless) 3.081E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOV LENGTH (Meters) 8.078E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.06E 02			
PSI1 AT Z1= -0.106761 PSI1 AT Z2= -0.053526 PSI2 AT Z1= -0.144271 PSI2 AT Z2= -0.072332	BOWEN RATIO (no units) -0.627			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by interpolation of:

SH1-SH2= +/- .001 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2251

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4131E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9007E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081530  
 START TIME: 15:31:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
12.803	16.91	6.80	NO DATA	1009.75	13.856	-1.053	-0.955	0.005	0.183

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM-2/3)
10.08	12.901	13.862	13.960	7.460E-03	66.86	6.087E-03	9.845	14.726	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 AT GMH	MOMENTUM FLUX (Nt/m2) -6.12E-01	FRICTION VELOCITY (Meters/sec) 7.068E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.996E-01	AIR DENSITY (Kg/m3) 1.2256
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.96E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.150E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.963E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4131E 02
Z/L AT GMH -0.009	LAT. HEAT FLUX (Watts/m2) 2.46E 02	SCALING POT. TEMP. (Kelvin) -2.386E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.686E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9007E 05
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m2) 2.09E 01	ROUGHNESS LENGTH (Meters) 1.439E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.793
MONIN-OBUKHOV LENGTH (Meters) -1.528E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.69E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.746E-03		ABS. HUMID. AT WT LEVEL (K /m3) 1.192E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.02E 02			BAR. PRES. AT WT LEVEL (Millibar) 1010.95
	BOWEN RATIO (no units) 0.085			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
61%	68%	61%	134%	41%	5%	28%	175%	31%	104%	10%	51%	61%
182%	182%	46%	37%	110%	5%	12%	147%	23%	60%	133%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081530  
 START TIME: 15:31:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.53E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.233E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.28E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.365E-05 [3.0E-05]
Z/L AT GMH 0.009 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.29E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 7.915E-02 [2.0E-02]
Z/L AT 10 METERS 0.007 [0.02]	SEN. HEAT FLUX (Watts/m2) -7.13E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.180E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.377E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.69E 02 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.27E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.63E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.240 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
58%	52%	33%	20%	98%	0%	30%	149%	17%	37%	97%	37%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905081600  
START TIME: 16: 1:50 PST  
END TIME: 16:32: 0 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.562	4.648	9.483	8.742	4.611	3.244	5.167
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.179	3.794	2.550	0.001	0.001	0.901	0.901	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2								
AIR TEMP. 1	AIR TEMP. 2	UPWIND NEAR	UPWIND LAND	DPFCAL	DPFCAL	WTHCAL	WS1EC	WS2EC	
1411 127987	1421 127613	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)	
		0.199	76	-0.008	-0.050	0.000	0.992	0.949	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. > .005V)	B(No. > .005V)	(No. > .002V)	(No. > 5V)	(No. > 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.799	18.20	6.93	NO DATA	320.7	1008.96	-4.52E 02	13.817	285.940
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.761	16.15	7.07	NO DATA	0.04	1010.06			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.979	13.866	14.046	7.521E-03	67.47	6.141E-03	9.925	14.710	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.24	12.851	13.839	13.929	7.603E-03	68.29	6.201E-03	10.033	14.690	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081600  
START TIME: 16: 1:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

START/ITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.009 AT GMH	MOMENTUM FLUX (Nt/m2) -1.54E 00	FRICTION VELOCITY (Meters/sec) 1.120E 00	GENERAL FORM: DN/DZ = [(N1-N2)]/(Ln(Z1/Z2)) (Z1*Z2)^(1/2)	GENERAL FORM: N SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 7.93E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.778E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.29E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.57E-01
Z/L AT GMH 0.013	LAT. HEAT FLUX (Watts/m2) 1.97E 02	SCALING POT. TEMP. (Kelvin) 9.179E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.36E 03
Z/L AT 10 METERS 0.010	SEN. HEAT FLUX (Watts/m2) -1.27E 02	ROUGHNESS LENGTH (Meters) 3.576E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.42E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 5.89E 00
Z/L AT 72 0.009	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.52E 02	DRAW COEF. AT 10 METERS (Dimensionless) 4.179E-03		N=Ln TEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOF LENGTH (Meters) 1.002E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.84E 02			
PSI1 AT Z1 = -0.086102 PSI1 AT Z2 = -0.043168 PSI2 AT Z1 = -0.116364 PSI2 AT Z2 = -0.058335	BOWEN RATIO (no units) -0.650			

## \* GENERAL CONSTANTS:

JOHN KARMAN	GRAVITATION	PROFILE	PROFILE	BULK	BULK
CONSTANT	ACCELERATION	TUR. PRANDTL	TUR. SCHMIDT	SEN. HEAT	MOISTURE
(No units)	(M/sec 2)	NUMBER	NUMBER	TRANSF. COEFF.	TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.15E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2255
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4133E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9009E 05



RUN NUMBER: 7905081600  
 START TIME: 16:15:00 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED ATMOSPHEROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.766	16.40	7.06	NO DATA	1009.96	13.817	-1.051	-0.953	0.026	0.124

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.864	13.843	13.941	7.593E-03	68.19	6.194E-03	10.020	14.693	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.007 AT 10M	MOMENTUM FLUX (Nt/m2) -5.64E-01	FRICTION VELOCITY (Meters/sec) 6.784E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.602E-01	AIR DENSITY (Kg/m3) 1.2259
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.31E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.120E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.311E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4134E 02
Z/L AT GMH -0.009	LAT. HEAT FLUX (Watts/m2) 2.30E 02	SCALING POT. TEMP. (Kelvin) -2.413E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.637E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9009E 05
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m2) 2.03F 01	ROUGHNESS LENGTH (Meters) 1.277E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.755
MONIN-OBUKHOV LENGTH (Meters) -1.392E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.52E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.712E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.02E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.16
	BOWEN RATIO (no units) 0.088			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
53%	58%	53%	130%	36%	5%	33%	166%	27%	103%	9%	47%	53%
100%	180%	46%	37%	110%	5%	13%	148%	23%	60%	133%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081600  
 START TIME: 16:15:00 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.02E 00 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.834E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.00E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -9.196E-05 [3.0E-05]
Z/L AT GMH 0.008 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.22E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 8.418E-02 [2.0E-02]
Z/L AT 10 METERS 0.006 [0.02]	SEN. HEAT FLUX (Watts/m2) -9.11E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.381E-03 [6.0E-04]
MONIN-OBUKHOV LENGTH (Meters) 1.712E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.52E 02 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 2.773 -03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.53E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.260 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
47%	48%	40%	9%	91%	0%	39%	142%	25%	30%	91%	48%	41%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905081630  
START TIME: 16:32:10 PST  
END TIME: 17:23:20 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1 UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.285	0.001	0.001	4.612	4.695	9.265	8.461	4.592	2.418	5.126

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.149	3.888	2.551	0.001	0.001	0.001	0.001	0.005

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND FAN	SPIFFAL	DEPT. 1	DEPT. 2	WIND	WIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 127235	1421 126901	0.183	96	0.888	-0.008	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. 1	AC FREQ. 1	AC VOLT. 2	AC FREQ. 2
(No. scans)	(No. scans)	(No. scans)	A(No.)(.005V)	B(No.)(.005V)	(No.)(.002V)	(No.)(5V)	(No.)(Hz)	(No.)(5V)	(No.)(Hz)
0	0	180	0	0	0	0	110.5	110.5	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS.

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	NEAR AIR TEMP
(Celsius)	(Meter/Sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Celsius)
12.723	17.78	7.23	NO DATA	319.3	1008.70	-3.37E-02	14.187	125.86

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/Sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.690	15.68	7.35	NO DATA	0.19	1009.89

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.903	13.813	13.993	7.679E-03	69.22	6.270E-03	10.131	14.635	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.780	13.789	13.879	7.752E-03	69.96	6.323E-03	10.207	14.619	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081630  
START TIME: 16:32:10 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1 UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
CRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.009 AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.62E-00	FRICTION VELOCITY (Meters/sec) 1.151E-00	GENERAL FORM: $\Delta N / \Delta Z$ $[(N1-N2) / (1/\ln(Z1/Z2) + 1)]$	GENERAL FORM: $N$ SLOPE $[(\ln Z1 - \ln Z2) - (\ln Z2 - \ln Z1)] / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 8.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.813E-01	N= WIND SPEED (M/sec) Z= HEIGHT (Meters) $\Delta N / \Delta Z = 2.34E-01$	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 3.47E-01
Z/L AT GMM 0.012	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.03E-02	SCALING POT. TEMP. (Kelvin) 0.941E-02	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (Meters) $\Delta N / \Delta Z = -8.92E-06$	N= SPEC. HUMIDITY (Kg/Kg) Z= HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -9.30E-03
Z/L AT 10 METERS 0.009	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -3.37E-02	ROUGHNESS LENGTH (Meters) 3.638E-03	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) $\Delta N / \Delta Z = 1.37E-02$	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 6.05E-00
Z/L AT Z1 0.012	TOTAL HEAT FLUX (Watts/m <sup>2</sup> ) -2.62E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 4.636E-03		N= LAT. HEAT FLUX (Watts/m <sup>2</sup> ) Z= HEIGHT (M) Vert. Axis PS1=NONE ET SLOPE=NO DATA
Z/L AT Z2 0.008				
MOMENTUM BULK FLUX LENGTH (Meters) 1.087E-03				
PS11 AT Z1 = -0.0793/2 PS11 AT Z2 = -0.052794 PS12 AT Z1 = -0.107259 PS12 AT Z2 = -0.053776	BOWEN RATIO (no units) -0.629			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2255

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .001 -3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kell.)  
2.414E-02

WATER LAT. HEAT VAP  
(J/cal./Kg)  
5.4013E-05

RUN NUMBER: 7905081630  
 START TIME: 16:32:10 PST  
 START DATE: 8 May 1979 (DAY 12H)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.694	15.94	7.34	NO DATA	1009.78	13.787	-1.093	-0.995	0.005	0.103

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.00	12.792	13.792	13.890	7.744E-03	69.87	6.316E-03	10.216	14.622	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) -0.008 AT GMM	MOMENTUM FLUX (Nt/m2) -5.24E-01	FRICTION VELOCITY (Meters/sec) 6.536E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.272E-01	AIR DENSITY (Kg/m3) 1.2259
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.69E-05	SCALING SPEC.HUMID. (Kg/Kg) -1.084E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.686E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4134E 02
Z/L AT GMM -0.011	LAT.HEAT FLUX (Watts/m2) 2.15E 02	SCALING POT.TEMP. (Kelvin) -2.538E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.659E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9013E 05
Z/L AT 10 METERS -0.008	SEN.HEAT FLUX (Watts/m2) 2.06E 01	ROUGHNESS LENGTH (Meters) 1.143E-03		VAP.PRES.AT WT LEVEL (Millibar) 15.722
MONIN-OBUKHOV LENGTH (Meters) -1.228E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.37E 02	DRAG COEF.AT 10 METERS (Dimensionless) 1.682E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.187E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.02E 02			BAR.PRES.AT WT LEVEL (Millibar) 1010.90
	BOWEN RATIO (no units) 0.096			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
51%	55%	50%	128%	35%	5%	40%	163%	25%	103%	9%	45%	50%
180%	180%	46%	38%	104%	5%	15%	146%	23%	61%	131%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081630  
 START TIME: 16:32:10 PST  
 START DATE: 8 May 1979 (DAY 12H)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) 0.005 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.05E 00 [4.0E-02]	FRICTION VELOCITY (Meters/sec) 8.908E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.59E-05 [3.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -8.97E-05 [3.0E-05]
Z/L AT GMM 0.007 [0.02]	LAT.HEAT FLUX (Watts/m2) 2.12E 02 [2.0E+01]	SCALING POT.TEMP. (Kelvin) 8.171E-02 [2.0E-02]
Z/L AT 10 METERS 0.005 [0.02]	SEN.HEAT FLUX (Watts/m2) -9.15E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.358E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 1.933E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.37E 02 [2.0E+01]	DRAG COEF.AT 10 METERS (Meters) 2.918E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.45E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.247 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
47%	49%	53%	3%	91%	0%	68%	147%	28%	29%	93%	53%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905081700  
START TIME: 17:23:30 PST  
END TIME: 17:32:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVE. GING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DFW POINT 1	DFW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.265	0.001	0.001	4.623	4.709	9.464	8.590	4.594	1.667	5.233
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AIR FREQ. 1	AIR FREQ. 2	MANUAL FLAG	7 LKO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.111	5.777	2.004	0.001	0.001	0.001	0.001	6.285		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1RFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.126400	1401.126240	0.199	62	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(Ne.) .005V	B(Ne.) .005V	(No.) .002V	(No.) .15V	(No.) 1Hz	(VAC)	(Hz)
0	0	160	0	0	0	0	0	115.5	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DFW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.649	18.17	7.30	NO DATA	322.9	1008.69	-2.32E-02	13.751	285.792
AIR TEMP. 2	WIND SPEED 2	DFW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.624	15.87	7.44	NO DATA	0.33	1009.79			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AKS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.820	13.735	13.914	7.715E-03	69.91	6.298E-03	10.175	14.554	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AKS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
7.20	12.714	13.729	13.819	7.797E-03	70.65	6.356E-03	10.283	14.555	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081700  
START TIME: 17:23:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (+/- Stable, Unstable) 0.006 AT GMM	MOMENTUM FLUX (Nt/m2) -2.00E-00	FRICTION VELOCITY (Meters/sec) 1.277E-00	GENERAL FORM: $DN/DZ = \frac{1}{(N1-N2)} \cdot \frac{1}{(1+Z1/Z2)^{1/2}}$	GENERAL FORM: $N'SLOPE = \frac{1}{(LnZ1-PS1) - (LnZ2-PS1)} \cdot \frac{1}{(N1-N2)}$
GEOMETRIC MEAN HEIGHT (Meters) GMM: $(Z1+Z2)/2$ 12.77	HUMIDITY FLUX (Kg/sec m2) 9.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.935E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = $2.56E-01$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = $3.13E-01$
Z/L AT GMM 0.009	LAT. HEAT FLUX (Watts/m2) 2.30E-02	SCALING POT. TEMP. (Kelvin) 7.853E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = $-8.92E-06$	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = $-9.11E-03$
Z/L AT 10 METERS 0.007	SUN. HEAT FLUX (Watts/m2) -1.24E-02	ROUGHNESS LENGTH (Meters) 3.671E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = $1.18E-02$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = $6.88E-00$
Z/L AT Z1 0.014	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.32E-02	DRAG COEF. AT 10 METERS (Dimensionless) 5.459E-04		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.27E-02			
MUNIN BROUWER LENGTH (Meters) 1.522E-03	ROSEN RATIO (no units) -0.541			
PS11 AT Z1 = 0.056655 PS11 AT Z2 = -0.028405 PS12 AT Z1 = -0.076560 PS12 AT Z2 = 0.031385				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION (M/sec2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SIN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

W1 SH2: +/- .001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2257

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4137E-02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9017E-05

RUN NUMBER: 7905081700  
 START TIME: 17: 2:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel./M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.626	16.15	7.42	NO DATA	1009.69	13.751	-1.125	-1.027	-0.021	0.077

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel./M-2/3)
10.00	12.724	13.730	13.928	7.787E-03	70.56	6.351E-03	10.271	14.555	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT 10M	MOMENTUM FLUX (Nt/m2) -5.42E-01	FRICTION VELOCITY (Meters/sec) 6.649E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.422E-01	AIR DENSITY (Kg/m3) 1.2261
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.65E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.061E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.648E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4137E-02
Z/L AT 10M -0.010	LAT. HEAT FLUX (Watts/m2) 2.14E-02	SCALING POT. TEMP. (Kelvin) -2.594E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.725E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9017E-05
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 2.14E-01	ROUGHNESS LENGTH (Meters) 1.203E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.603
MONIN-OBUKHOV LENGTH (Meters) -1.243E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.32E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.696E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.104E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.61E-00			BAR. PRES. AT WT LEVEL (Millibar) 1010.89
	BOWEN RATIO (no units) 0.100			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
49%	52%	47%	126%	34%	5%	50%	160%	23%	103%	10%	43%	47%
179%	179%	46%	38%	107%	5%	18%	145%	23%	61%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081700  
 START TIME: 17: 2:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.003 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -1.26E-00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.679E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.80E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 8.86E-05 (3.0E-05)
Z/L AT 10M 0.004 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.17E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 7.086E-02 (2.0E-02)
Z/L AT 10 METERS 0.003 (0.02)	SEN. HEAT FLUX (Watts/m2) -8.92E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.430E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 3.059E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.32E-02 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 3.42E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.20E-01 (3.9E+01)	
	BOWEN RATIO (no units) -0.204 (0.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
41%	42%	58%	4%	92%	0%	224%	157%	32%	27%	97%	51%	55%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081730  
START TIME: 17:32:50 PST  
END TIME: 18: 3: 0 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.631	4.716	9.599	8.825	4.579	0.868	5.212

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRD REF.	SPARE A	SPARE B	VOLT.REF.B
4.065	3.776	2.549	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1BFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 124619	1421 124956	0.199	57	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DEV	VOLT.REF.DEV	ZFRD REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THF ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Celsius)	(Kel.xM-2/3)	(Kel.xM-2/3)
12.462	18.42	7.35	NO DATA	322.2	1308.47	-1.21E 02	13.706	265.639

AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
12.496	16.30	7.48	NO DATA	0.45	1009.57

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ARS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.642	13.559	13.739	7.742E-03	70.96	6.318E-03	10.206	14.382	NO DATA

HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ARS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.586	13.603	13.693	7.822E-03	71.46	6.377E-03	10.312	14.429	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081730  
START TIME: 17:32:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER,1973):

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR.WITH HEIGHT)
GRAD.RICHARDSON NUMBER (+Stable,-Unstable) 0.004 AT GHM	MOMENTUM FLUX (Nt/m2) -1.77E 00	FRICTION VELOCITY (Meters/sec) 1.200E 00	GENERAL FORM:DN/DZ= [(N1-N2)/ln(Z1/Z2)]* (Z1*Z2)^(1/2)	GENERAL FORM:N/SLOPE= [(LnZ1-PSI1)-(LnZ2-PSI1)]/ [N1-N2]
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 8.91E-05	SCALING SPEC.HUMID. (Kg/Kg) -6.058E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 2.37E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSI1 WS SLOPE= 3.33E-01
Z/L AT GHM 0.005	LAT. HEAT FLUX (Watts/m2) 2.20E 02	SCALING POT. TEMP. (Kelvin) 4.240E-02	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -8.92E 03
Z/L AT 10 METERS 0.004	SFN. HEAT FLUX (Watts/m2) -6.30E 01	ROUGHNESS LENGTH (Meters) 3.691E-03	N=POT.TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 6.24E-03	N=POT.TEMP. (Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= 1.27E 01
Z/L AT Z1 0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.21E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 4.678E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.62E 01			
MONIN-OBUKHOV LENGTH (Meters) 2.487E 03	BOWEN RATIO (no units) -0.286			
PSI1 AT Z1= -0.034672 PSI1 AT Z2= -0.017383 PSI2 AT Z1= -0.046854 PSI2 AT Z2= -0.023491				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR.PRANDTL NUMBER	PROFILE TUR.SCHMIDT NUMBER	BULK SFN HEAT TRANSF.COEFF.	BULK MOISTURE TRANSF.COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2260

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SMI SH2 +/- .00F-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/Kel./Kg)  
2.4137E 02

WATER LAT. HEAT VAP.  
(J/Kel./Kg)  
5.9026E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081730  
 START TIME: 17:32:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.492	16.56	7.47	NO DATA	1009.48	13.706	-1.214	-1.116	-0.108	-0.010

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.590	13.598	13.696	7.812E-03	71.40	6.370E-03	10.299	14.424	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GMH	MOMENTUM FLUX (Nt/m2) -5.79E-01	FRICTION VELOCITY (Meters/sec) 6.872E-01	WITH LONG. VFLOCITY (Meter2/sec2) -4.722E-01	AIR DENSITY (Kg/m3) 1.2264
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.74E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.037E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.735E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4138E 02
Z/L AT GMH -0.010	LAT. HEAT FLUX (Watts/m2) 2.16E 02	SCALING POT. TEMP. (Kelvin) -2.765E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.900E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9025E 05
Z/L AT 10 METERS -0.008	SEN. HEAT FLUX (Watts/m2) 2.36E 01	ROUGHNESS LENGTH (Meters) 1.327E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.634
MONIN-OBUKHOV LENGTH (Meters) -1.245E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.21E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.723E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.18E 02			BAR. PRES. AT WT LEVEL (Millibar) 1010.68
	BOWEN RATIO (no units) 0.109			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-"

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
60%	62%	52%	129%	44%	6%	71%	173%	26%	103%	17%	46%	52%
175%	175%	46%	38%	103%	6%	24%	141%	23%	61%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081730  
 START TIME: 17:32:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.001 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.13E 00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.274E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.70E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 8.765E-05 (3.0E-05)
Z/L AT GMH 0.001 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.17E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 3.384E-02 (2.0E-02)
Z/L AT 10 METERS 0.001 (0.02)	SEN. HEAT FLUX (Watts/m2) -3.73E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.468E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.176E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.21E 02 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 3.005E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 9.77E 01 (3.0E+01)	
	BOWEN RATIO (no units) -0.068 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
33%	33%	52%	1%	125%	0%	47%	248%	28%	25%	130%	48%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081800  
START TIME: 18:31:10 PST  
END TIME: 18:33:20 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.675	4.758	9.482	8.662	4.588	0.240	5.308
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.841	3.798	2.550	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR		UPWIND LAND	DP/FICAL	W/FICAL	W/FICAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH		PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.123415	1421.124308	0.199		52	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. >.005V)	B(No. >.005V)	(No. >.002V)	(No. >5V)	(No. >1Hz)	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.5	59.60

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.342	18.20	7.61	NO DATA	325.5	1008.60	-3.35E-01	13.682	285.546
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.431	16.06	7.73	NO DATA	0.55	1009.70			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	AHS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF.INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.521	13.458	13.638	7.886E-03	72.81	6.433E-03	10.391	14.270	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	AHS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF.INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	12.521	13.557	13.648	7.960E-03	73.01	6.481E-03	10.492	14.370	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081800  
START TIME: 18:31:10 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
MRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.001 AT GMH	MOMENTUM FLUX (Nt/m2) -2.00E-00	FRICTION VELOCITY (Meters/sec) 1.276E-00	GENERAL FORM: DN/DZ = 1/(N1-N2) * 1/(N1(Z1/Z2) * (Z1*Z2)^(1/2))	GENERAL FORM: N SLOPE = 1/(LN(Z1-PSI) - (LN(Z2-PSI) - (N1-N2))
GEOMETRIC MEAN HEIGHT (Meter) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.82E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.273E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.45E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.13E-01
Z/L AT GMH 0.001	LAT. HEAT FLUX (Watts/m2) 2.43E-02	SCALING POT. TEMP. (Kelvin) -6.273E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.62E-03
Z/L AT Z1 -0.001	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.35E-01	ROUGHNESS LENGTH (Meters) 3.672E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -8.62E-01
Z/L AT Z2 -0.000	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.19E-02	DRAW COEF. AT 10 METERS (Dimensionless) 5.450E-03		N=LAT. TEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-OBUKHOF LENGTH (Meters) -1.197E-04	ROSEN RATIO (no units) 0.041			
PSI1 AT Z1 = 0.003610 PSI1 AT Z2 = 0.001114 PSI2 AT Z1 = 0.002169 PSI2 AT Z2 = 0.001089				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUM. PRANDTL NUMBER 0.74	PROFILE TUM. SCHMIDT NUMBER 0.74	BULK SIN HEAT TRANSF. COEF. 0.921-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SH2 +/- 600 (Kg/Kg)  
PTK1 PTK2 +/- 000 rel

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2265
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4140E-02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9031E-05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905081800  
 START TIME: 18: 3:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.426	16.27	7.72	NO DATA	1009.61	13.682	-1.262	-1.164	-0.137	-0.039

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.518	13.545	13.643	7.952E-03	72.99	6.481E-03	10.480	14.358	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -5.53E-01	FRICTION VELOCITY (Meters/sec) 6.714E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.508E-01	AIR DENSITY (Kg/m3) 1.2268
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.25E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.002E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 8.251E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4140E-02
Z/L AT GMM -0.011	LAT. HEAT FLUX (Watts/m2) 2.04E-02	SCALING POT. TEMP. (Kelvin) -2.893E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.943E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9029E-05
Z/L AT 10 METERS -0.009	SEN. HEAT FLUX (Watts/m2) 2.41E-01	ROUGHNESS LENGTH (Meters) 1.239E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.613
MONIN-OBUKHOV LENGTH (Meters) -1.136E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.35E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.704E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.95E-02			BAR. PRES. AT WT LEVEL (Millibar) 1010.81
	BOWEN RATIO (no units) 0.118			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
144%	144%	58%	136%	136%	7%	116%	272%	29%	107%	107%	49%	58%
173%	173%	46%	38%	101%	7%	31%	139%	23%	61%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081800  
 START TIME: 18: 3:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.004 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -1.19E-00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.390E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.60E-05 (0.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.65E-05 (3.0E-05)
Z/L AT GMM -0.006 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.12E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -1.678E-02 (2.0E-02)
Z/L AT 10 METERS -0.004 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.81E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.376E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -2.335E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.35E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.225E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.00E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.092 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
21%	21%	61%	16%	40%	0%	7%	44%	32%	22%	57%	51%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081830  
START TIME: 18:33:30 PST  
END TIME: 19: 3:40 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.730	4.814	8.766	7.885	4.619	-0.066	5.389
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFRO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.045	3.747	2.552	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPPFCAL	DPPFCAL	WSPFCAL	WSIFC	WSDEC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(No. 1) 0.05V	(No. 2) 0.05V	(No. 1) Hz	(Coeff.)	(Coeff.)
1411 122347	1421 123542	0.199	49	-0.008	-0.050	0.000	0.992	0.949

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZFRO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AL FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. 1) 0.05V	(No. 2) 0.05V	(No. 1) 0.02V	(No. 1) 5V	(No. 1) Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	19.75

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.735	16.72	7.94	NO DATA	328.2	1009.07	9.20E 00	13.686	285.454
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel. xM-2/3)	(Meter MSL)	(Millibar)			
12.354	14.58	8.07	NO DATA	0.61	1010.17			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
18.35	12.415	13.376	13.556	8.072E-03	74.99	6.579E-03	10.632	14.177	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel. xM-2/3)
9.20	12.444	13.507	13.597	8.150E-03	75.07	6.639E-03	10.739	14.314	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905081830  
START TIME: 18:33:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.002 AT GMM	MOMENTUM FLUX (Nt/m2) -1.92E 00	FRICTION VELOCITY (Meters/sec) 1.249E 00	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(Ln(Z1/Z2)) * (Z1+Z2)]^{1/2}$	GENERAL FORM: $N' SLOPE = [(LnZ1-PSI1) - (LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 9.64E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.301E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DMS/DZ = 2.30E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.20E-01
Z/L AT GMM -0.003	LAT. HEAT FLUX (Watts/m2) 2.39E 02	SCALING POT. TEMP. (Kelvin) -2.352E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.5HE 03
Z/L AT 10 METERS -0.002	SFN. HEAT FLUX (Watts/m2) 3.65E 01	ROUGHNESS LENGTH (Meters) 3.693E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.33E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.30E 01
Z/L AT Z2 -0.002	SKY AND SOLAR HEAT FLUX (Watts/m2) 5.20E 00	DRAG COEF. AT 10 METERS (Dimensionless) 6.222E-03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
MONIN-BRUKHOV LENGTH (Meters) -4.925E 03	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.84E 02			
PSI1 AT Z1 = 0.014015 PSI1 AT Z2 = 0.007087 PSI2 AT Z1 = 0.008449 PSI2 AT Z2 = 0.004263	BOWEN RATIO (no units) 0.153			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2274

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2+ +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4143E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9036E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905081830  
 START TIME: 18:33:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.340	14.84	8.05	NO DATA	1010.08	13.686	-1.346	-1.248	-0.195	-0.097

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.438	13.491	13.589	8.141E-03	75.06	6.631E-03	10.726	14.298	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEME ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.012 AT GMM	MOMENTUM FLUX (Nt/m2) -4.35E-01	FRICTION VELOCITY (Meters/sec) 5.953E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.544E-01	AIR DENSITY (Kg/m3) 1.2276
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.813E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.171E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMM -0.016	LAT. HEAT FLUX (Watts/m2) 1.77E 02	SCALING POT. TEMP. (Kelvin) -3.198E-02	WITH POT. TEMPERATURE (Meter Kelvin./sec) 1.904E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9033E 05
Z/L AT 10 METERS -0.012	SEN. HEAT FLUX (Watts/m2) 2.36E 01	ROUGHNESS LENGTH (Meters) 8.540E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.623
MONIN-OBUKHOV LENGTH (Meters) -8.075E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.20E 00	DRAG COEF. AT 10 METERS (Dimensionless) 1.609E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.10E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.28
	BOWEN RATIO (no units) 0.133			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
68%	68%	48%	127%	54%	13%	107%	182%	24%	103%	30%	44%	48%
170%	170%	46%	39%	98%	13%	35%	137%	23%	62%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081830  
 START TIME: 18:33:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -1.16E 00 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 9.156E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.75E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.49E-05 [3.0E-05]
Z/L AT GMM -0.007 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.92E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.521E-02 [2.0E-02]
Z/L AT 10 METERS -0.005 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.19E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.258E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.995E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.20E 00 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 3.708E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.28E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.142 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
28%	28%	64%	18%	21%	0%	18%	7%	36%	21%	20%	63%	62%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905081900  
START TIME: 19: 3:50 PST  
END TIME: 19:54: 0 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.000	0.001	4.675	4.767	9.225	8.441	4.630	-0.103	5.514

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
4.027	3.735	2.533	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NFAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP 1	AIR TEMP 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121309	1421 122534	0.206	39	-0.008	-0.050	0.000	0.991	0.947

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	7-REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No.) .005V	B (No.) .005V	(No.) .002V	(No.) .15V	(No.) 1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.5	59.73

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.131	17.71	7.61	NO DATA	332.5	1009.25	1.44E 01	13.669	285.352

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.253	15.56	7.78	NO DATA	0.64	1010.35

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.311	13.247	13.427	7.899E-03	73.85	6.434E-03	10.400	14.083	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.344	13.263	13.473	7.990E-03	74.13	6.511E-03	10.535	14.212	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081900  
START TIME: 19: 3:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.002 AT GHM	MOMENTUM FLUX (Nt/m2) -1.94E 00	FRICTION VELOCITY (Meters/sec) 1.257E 00	GENERAL FORM: DN/DZ = [(N1-N2)]/[ln(Z1/Z2)] = (Z1*Z2)^(1/2)	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 9.73F-05	SCALING SPEC. HUMID. (Kg/Kg) -6.305E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 2.39E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.18E-01
Z/L AT GHM -0.003	LAT. HEAT FLUX (Watts/m2) 2.41E 02	SCALING POT. TEMP. (Kelvin) -2.588E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.57E 03
Z/L AT 10 METERS -0.002	SEN. HEAT FLUX (Watts/m2) 4.04E 01	ROUGHNESS LENGTH (Meters) 3.689E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) NPT/DZ = -3.66E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -2.89E 0
Z/L AT Z1 -0.004	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 5.575E-03		N=LnTEMP. STRUC. (Km-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.002	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.95E 02			
MONIN-BRUKHOV LENGTH (Meters) -4.433E 03	BOWEN RATIO (no units) 0.168			
PSI1 AT Z1 = 0.015231 PSI1 AT Z2 = 0.007708 PSI2 AT Z1 = 0.009187 PSI2 AT Z2 = 0.004637				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SFN HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2281

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4148E 02

WATER LAT. HEAT CAP.  
(Jcal./Kg)  
5.9042E 05

RUN NUMBER: 7905081900  
 START TIME: 19: 3:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.239	15.82	7.76	NO DATA	1010.25	13.669	-1.430	-1.332	-0.302	-0.204

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.337	13.367	13.465	7.984E-03	74.09	6.502E-03	10.519	14.197	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.011 AT GMH	MOMENTUM FLUX (Nt/m2) -5.15E-01	FRICTION VELOCITY (Meters/sec) 6.475E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.192E-01	AIR DENSITY (Kg/m3) 1.2283
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.95E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.994E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.948E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4140E 02
Z/L AT GMH -0.014	LAT. HEAT FLUX (Watts/m2) 1.96E 02	SCALING POT. TEMP. (Kelvin) -3.304E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.139E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
Z/L AT 10 METERS -0.011	SEN. HEAT FLUX (Watts/m2) 2.66E 01	ROUGHNESS LENGTH (Meters) 1.110E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.609
MONIN-OBUKHOV LENGTH (Meters) -9.241E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.674E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.37E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.45
	BOWEN RATIO (no units) 0.135			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
68%	68%	50%	129%	53%	10%	105%	182%	25%	103%	28%	45%	50%
168%	168%	46%	39%	96%	10%	34%	134%	23%	62%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081900  
 START TIME: 19: 3:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.005 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.20E 00 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 9.384E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.36E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.618E-05 [3.0E-05]
Z/L AT GMH -0.006 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.07E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.724E-02 [2.0E-02]
Z/L AT 10 METERS -0.005 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.54E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.368E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -2.117E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.44E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 3.402E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.51E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.149 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
23%	23%	60%	12%	20%	0%	13%	11%	32%	27%	15%	54%	58%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905081930  
START TIME: 19:34:10 PST  
END TIME: 20: 4:20 PST  
START DATE: 8 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC.1	TEMP. STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.657	4.747	8.959	8.162	4.647	-0.104	5.496
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.006	3.733	2.552	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 120492	1421 121761	0.206	.39	-0.908	-0.050	0.900	0.991	0.947

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).5V	(No.).1Hz	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.5	59.73

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP. STRUC.1	WIND DIR.	BAR. PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.049	17.18	7.50	NO DATA	331.8	1009.51	1.45E 01	13.648	285.273
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP. STRUC.2	TIDE TABLE	BAR. PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.176	15.05	7.67	NO DATA	0.63	1010.60			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.229	13.156	13.336	7.843E-03	73.68	6.380E-03	10.324	14.011	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.266	13.297	13.387	7.930E-03	73.91	6.459E-03	10.454	14.144	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905081930  
START TIME: 19:34:10 PST  
START DATE: 8 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.003 AT GMM	MOMENTUM FLUX (Nt/m2) -1.91E 00	FRICTION VELOCITY (Meters/sec) 1.247E 00	GENERAL FORM: $DN/DZ = [ (N1-N2) / (Ln(71/72) * (Z1*Z2)^(1/2) ]$	GENERAL FORM: $N' SLOPE = [ (LnZ1 - PSI1) - (LnZ2 - PSI1) ] / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 9.67E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.311E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 2.37E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 3.21E-01
Z/L AT GMM -0.003	LAT. HEAT FLUX (Watts/m2) 2.39E 02	SCALING POT. TEMP. (Kelvin) -2.934E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.54E 03
Z/L AT 10 METERS -0.003	SFN. HEAT FLUX (Watts/m2) 4.54E 01	ROUGHNESS LENGTH (Meters) 3.694E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.15E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.84E 01
Z/L AT Z1 -0.005	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 5.850E-03		N=LTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.002	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.99E 02			
MONIN-BUKHOV LENGTH (Meters) -3.845E 03	BOWEN RATIO (no. units) 0.190			
PSI1 AT Z1= 0.017512 PSI1 AT Z2= 0.008875 PSI2 AT Z1= 0.010570 PSI2 AT Z2= 0.005341				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SFN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-BH2= +/- 0.01 -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2288
AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4139E 02
WATER LAT. HEAT VAP. (Jcal./Kg) 5.9046E 05

RUN NUMBER: 7905081930  
 START TIME: 19:34:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.161	15.31	7.65	NO DATA	1010.51	13.648	-1.487	-1.309	-0.368	-0.270

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.259	13.280	13.378	7.927E-03	73.88	6.450E-03	10.438	14.128	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.012 AT 6MH	MOMENTUM FLUX (Nt/m2) -4.73E-01	FRICTION VELOCITY (Meters/sec) 6.202E-01	WITH LONGC. VELOCITY (Meter2/sec2) -3.846E-01	AIR DENSITY (Kg/m3) 1.2290
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.022E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.786E-05	AIR SPECIFIC HEAT (J/Kcal/Kg Kel.) 2.4139E 02
Z/L AT 6MH -0.016	LAT. HEAT FLUX (Watts/m2) 1.92E 02	SCALING POT. TEMP. (Kelvin) -3.478E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.157E-02	WATER LAT. HEAT VAP. (J/Kcal/Kg) 5.9044E 05
Z/L AT 10 METERS -0.012	SEN. HEAT FLUX (Watts/m2) 2.68E 01	ROUGHNESS LENGTH (Meters) 9.718E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.592
MONIN-OBUKHOV LENGTH (Meters) -8.053E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.641E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.34E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.71
	BOWEN RATIO (no units) 0.139			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
64%	64%	49%	128%	49%	10%	102%	177%	24%	103%	25%	44%	49%
166%	166%	46%	58%	94%	10%	33%	132%	23%	61%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905081930  
 START TIME: 19:34:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.005 (0.02) AT 6MH	MOMENTUM FLUX (Nt/m2) -1.17E 00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.237E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 8.22E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.760E-05 (3.0E-05)
Z/L AT 6MH -0.007 (0.02)	LAT. HEAT FLUX (Watts/m2) 2.03E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.029E-02 (2.0E-02)
Z/L AT 10 METERS -0.005 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.90E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.310E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.875E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.535E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.50E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.161 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
27%	27%	62%	13%	25%	0%	15%	16%	34%	23%	11%	59%	60%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 2905082000  
START TIME: 20:43:30 PST  
END TIME: 20:54:40 PST  
START DATE: 8 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR
6.285	0.001	0.001	4.679	4.763	8.705	7.909	4.636	10.164	5.278
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK MT. TEMP.	AIR FREQUENCY	AIR VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.978	4.757	2.547	0.001	0.001	0.001	0.001	6.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND (AND	OFFICAL	OFFICAL	WINDICAL	WINDIC	WINDIC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.170070	1421.171627	0.159	5.0	0.005	0.050	0.003	0.005	0.049

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AIR FREQUENCY	AC VOLTAGE	AIR FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(Kelvin/0.005V)	(Kelvin/0.005V)	(Kelvin/0.002V)	(No. 150V)	(Hz)	(V)	(Hz)
0	0	180	0	0	0	0	115.5	115.5	59.76

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK MT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Celsius)
12.997	10.71	7.64	NO DATA	394.4	1009.33	1.45E-01	14.621	205.242
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Meter MSL)	(Millibar)			
12.137	14.63	7.76	NO DATA	0.58	1010.43			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REL. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
18.35	12.187	13.124	13.304	7.916E-03	74.58	6.445E-03	10.419	13.969	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REL. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
9.20	12.227	13.264	13.355	7.990E-03	74.59	6.501E-03	10.520	14.155	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 2905082000  
START TIME: 20:43:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (CONTINUED WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.003 AT 6M	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.85E-00	FRICITION VELOCITY (Meters/sec) 1.328E-00	GENERAL FORM D <sub>1</sub> D <sub>2</sub> ((N1/N2)/((N1/Z1) <sup>2</sup> - (N2/Z2) <sup>2</sup> )) (Z1*Z2) <sup>1/2</sup>	GENERAL FORM N SLOPE ((Z1/Z2) <sup>2</sup> - (Z1/Z2) <sup>2</sup> )/((N1/N2) <sup>2</sup> - (N1/N2) <sup>2</sup> ) 1N1-N2
GEOMETRIC MEAN HEIGHT (Meters) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 9.53E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.316E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = 2.33E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1-PS11 WS SLOPE = 3.20E-01
Z/L AT 6M -0.004	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.34E-02	SCALING POT. TEMP. (Kelvin) -3.163E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PS1-PS10 SH SLOPE = -8.54E-03
Z/L AT 10 METERS -0.003	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.82E-01	ROUGHNESS LENGTH (Meters) 3.69E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -4.47E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1-PS12 PTK SLOPE = 1.71E-01
Z/L AT Z1 -0.005	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 0.009E-03		N-TEMP. SLOPE (K/M) <sup>2/3</sup> Z-HEIGHT (M) Vert. Axis PS1-PS12 ETD SLOPE END DATA
Z/L AT Z2 0.003	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.98E-02			
MONIN-OBUKHOV LENGTH (Meters) -1.453E-03				
PS11 AT Z1 = 0.019450 PS11 AT Z2 = 0.009869 PS12 AT Z1 = 0.011748 PS12 AT Z2 = 0.005941	BOWEN RATIO (no. units) 0.265			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.7959	PROFILE THERM. PRANDTL NUMBER 0.74	PROFILE THERM. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2087

AIR SPECIFIC HEAT  
(J/Kg m<sup>2</sup>)  
2.4140E-02

WATER LAT. HEAT VAP.  
(J/Kg m<sup>2</sup>)  
5.9049E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.00E-03 Kg/Kg.

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905082000  
 START TIME: 20: 4:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	SOLK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.121	14.88	7.75	NO DATA	1010.34	13.621	-1.500	-1.402	-0.373	-0.275
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.219	13.248	13.346	7.982E-03	74.59	6.495E-03	10.598	14.069	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978).

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
UNAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014 AT GMM	MOMENTUM FLUX (Nt/m2) -4.38E-01	FRICTION VELOCITY (Meters/sec) 5.973E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.568E-01	AIR DENSITY (Kg/m3) 1.2289
GEOMETRIC MEAN HEIGHT (Meter) GMM (Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 7.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.010E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.416E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4140E-02
Z/L AT GMM -0.010	LAT. HEAT FLUX (Watts/m2) 1.83E-02	SCALING POT. TEMP. (Kelvin) -3.547E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.118E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.9046E-05
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m2) 2.63E-01	ROUGHNESS LENGTH (Meters) 8.632E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.561
MOMIN. OBUKHOV LENGTH (Meters) -7.324E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COFF. AT 10 METERS (Dimensionless) 1.612E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.24E-02			HAR. PRES. AT WT LEVEL (Millibar) 101.54
	ROMEN RATIO (no units) 0.144			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "per-".

GRAD. RICH. ED AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF
62%	62%	48%	127%	47%	10%	101%	175%	24%	103%	23%	44%	48%
164%	164%	46%	39%	94%	10%	33%	132%	23%	62%	117%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905082000  
 START TIME: 20: 4:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* LONGITUDE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
UNAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 [0.001] AT GMM	MOMENTUM FLUX (Nt/m2) -1.13E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 9.517E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM (Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 7.91E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.687E-05 [3.0E-05]
Z/L AT GMM 0.008 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.95E-02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.224E-02 [2.0E-02]
Z/L AT 10 METERS 0.006 [0.02]	SEN. HEAT FLUX (Watts/m2) 4.09E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.262E-03 [6.0E-05]
MOMIN. OBUKHOV LENGTH (Meters) 1.712E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 [2.0E+01]	DRAW COFF. AT 10 METERS (Meters) 3.60E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.43E-02 [3.0E+01]	
	ROMEN RATIO (no units) 0.170 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "per-".

GRAD. RICH. NO AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF
10%	10%	63%	15%	28%	0%	15%	18%	35%	27%	7%	63%	61%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905082030  
START TIME: 20:34:50 PST  
END TIME: 21: 5: 0 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.682	4.759	8.711	8.069	4.655	-0.104	5.158

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.968	3.930	2.544	0.001	0.001	0.001	0.001	6.235

## DIGITAL CHANNEL RAW DATA (AVERAGE):

## ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPTFCAL	DPTFCAL	WTFCAL	WSIFC	WS2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.119632	1421.120895	0.199	54	-0.008	-0.050	0.000	0.992	0.949

## SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BANE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.005V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1.5Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.93

## OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/Sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.963	15.73	7.65	NO DATA	370.4	1009.32	1.45E-01	13.603	285.116

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/Sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
12.096	14.92	7.74	NO DATA	0.50	1010.42

## CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.143	13.082	13.262	7.926E-03	74.67	6.452E-03	10.429	13.929	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.29	12.180	13.215	13.305	7.979E-03	74.70	6.491E-03	10.503	14.061	NO DATA

## CONTINUED BELOW

RUN NUMBER: 7905082030  
START TIME: 20:34:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.003 At GH	MOMENTUM FLUX (Nt/m2) -1.40E-00	FRICTION VELOCITY (Meters/sec) 1.066E-00	GENERAL FORM: $DN/DZ = (N1-N2)/(1+ln(Z1/Z2))$	GENERAL FORM: $N SLOPE = (ln Z1 - PSI1) - (ln Z2 + PSI2) / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meters) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 8.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.329E-05	N-WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.02E-01	N-WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PSI1 WS SLOPE = 3.75E-01
Z/L AT GH -0.005	LAT. HEAT FLUX (Watts/m2) 2.09E-02	SCALING POT. TEMP. (Kelvin) -2.898E-02	N-SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PSI2 SH SLOPE = -8.54E-03
Z/L AT 10 METERS -0.004	SKY HEAT FLUX (Watts/m2) 3.84E-01	ROUGHNESS LENGTH (Meters) 3.423E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -4.08E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PSI2 PTV SLOPE = -1.87E-01
Z/L AT Z1 -0.004	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 4.52H-03		
Z/L AT Z2 -0.003	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.58E-02			
MONIN-ORINKHOV LENGTH (Meters) -2.838E-03	ROUEN RATIO (No units) 0.187			
PS11 AT Z1 = 0.073542 PS11 AT Z2 = 0.011574 PS12 AT Z1 = 0.014238 PS12 AT Z2 = 0.007714				

## GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION (M/sec 2) 9.7959	PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SH2 +/- 0.001-3 Kg/Kg.

## MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2289
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AIR SPECIFIC HEAT (J/cal./kg Kel.) 2.414E-02
--

WATER LAT. HEAT VAP. (J/cal./kg) 5.9051E-05
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RUN NUMBER: 7905082030  
 START TIME: 20:34:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	UIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
12.074	15.14	7.73	NO DATA	1010.32	13.603	-1.529	-1.431	-0.404	-0.306

HEIGHT (Meters)	POT. TEMP. (Celsius)	UIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel xM-2/3)
10.00	12.172	13.199	13.297	7.972E-03	74.72	6.486E-03	10.495	14.045	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.013 AT 10M	MOMENTUM FLUX (Nt/m2) -4.59E-01	FRICTION VELOCITY (Meters/sec) 6.108E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.731E-01	AIR DENSITY (Kg/m3) 1.2291
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.54E-05	SCALING SPEC. HUMID. (Kg/Kg) -1.904E-04	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.537E-05	AIR SPECIFIC HEAT (JTral./Kg Kel.) 2.4140E 02
Z/L AT 10M -0.017	LAT. HEAT FLUX (Watts/m2) 1.86E 02	SCALING POT. TEMP. (Kelvin) -3.590E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.193E-02	WATER LAT. HEAT VAP. (JTral./Kg) 5.9049E 05
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 2.72E 01	ROUGHNESS LENGTH (Meters) 9.267E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.544
MONIN-OBUKHOV LENGTH (Meters) -7.567E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.629E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.28E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.5:
	BOWEN RATIO (no units) 0.146			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
71%	71%	56%	132%	54%	10%	105%	185%	28%	104%	25%	48%	56%
165%	165%	46%	39%	93%	10%	33%	132%	23%	62%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905082030  
 START TIME: 20:34:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -8.81E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 8.158E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.71E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.655E-05 [3.0E-05]
Z/L AT 10M -0.008 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.91E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.022E-02 [2.0E-02]
Z/L AT 10 METERS -0.006 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.43E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.105E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.554E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.834E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.35E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.163 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
26%	26%	54%	6%	17%	0%	7%	13%	28%	22%	14%	59%	5%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

RUN NUMBER: 7905082100  
START TIME: 21: 5:10 PST  
END TIME: 21:35:26 PST  
START DATE: 0 May 1979 (DAY 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00 VOLT. REF. A 8.205	No.01 TEMP. STRUC.1 0.001	No.02 TEMP. STRUC.2 0.001	No.03 DEW POINT1 4.717	No.04 DEW POINT2 4.799	No.05 WIND SPEED1 8.166	No.06 WIND SPEED2 7.488	No.07 BAR. PRES.2 4.643	No.08 SKY RAD. -0.104	No.09 WIND DIR. 5.131
No.10 BULK WT TEMP 3.939	No.11 AC FREQUENCY 3.808	No.12 AC VOLTAGE 2.538	No.13 MANUAL FLAG 0.001	No.14 ZFRD REF. 0.001	No.15 SPARE A 0.001	No.16 SPARE B 0.001	No.17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1 AIR TEMP.1 1411 119167	No.2 AIR TEMP.2 1421 120486	UPWIND NEAR HEIGHT/LENGTH 0.183	UPWIND LAND PATH (Meters) 03	DP1FCAL (Volts) -0.008	DP2FCAL (Volts) -0.050	WTBFCAL (Volts) 0.000	WS1EC (Coeff.) 0.992	WS2EC (Coeff.) 0.952
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA BASE (No. scans) 180	VOLT. REF. DEV A(No.).005V 0	VOLT. REF. DEV B(No.).005V 0	ZFRD REF. DEV (No.).002V 0	AC VOLT. FLUX (No.).5V 0	AC FREQ. FLUX (No.).1Hz 0	AC VOLTAGE (VAC) 115.4	AC FREQUENCY (Hz) 59.81
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1 (Celsius) 11.717	WIND SPEED1 (Meter/sec) 15.69	DEW POINT1 (Celsius) 7.86	TEMP. STRUC.1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 319.5	BAR. PRES.1 (Millibar) 1007.45	SKY RAD. (Watt/m2) 1.45E 01	BULK WT TEMP (Celsius) 13.583	MEAN AIR TEMP (Kelvin) 285.143
AIR TEMP.2 (Celsius) 12.049	WIND SPEED2 (Meter/sec) 13.90	DEW POINT2 (Celsius) 7.98	TEMP. STRUC.2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.38	BAR. PRES.2 (Millibar) 1010.55			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP.1 (Celsius) 12.097	VIR. TEMP.1 (Celsius) 13.051	V. POT. TEMP.1 (Celsius) 13.231	ABS. HUMID.1 (Kg/m3) 8.041E-03	REL. HUMID.1 (Percent) 76.17	SPEC. HUMID.1 (Kg/Kg) 6.544E-03	VAP. PRES.1 (Millibar) 10.579	S. VAP. PRES.1 (Millibar) 13.888	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP.2 (Celsius) 12.139	VIR. TEMP.2 (Celsius) 13.193	V. POT. TEMP.2 (Celsius) 13.283	ABS. HUMID.2 (Kg/m3) 8.112E-03	REL. HUMID.2 (Percent) 76.13	SPEC. HUMID.2 (Kg/Kg) 6.598E-03	VAP. PRES.2 (Millibar) 10.677	S. VAP. PRES.2 (Millibar) 14.025	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905082100  
START TIME: 21: 5:10 PST  
START DATE: 0 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOG  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.004 AT GHM	MOMENTUM FLUX (Nt/m2) -1.37E 00	FRICTION VELOCITY (Meters/sec) 1.056E 00	GENERAL FORM: $DN/DZ = ((N1-N2))/((N1+Z1)/(N2+Z2))$	GENERAL FORM: $N' SLOPE = ((LN Z1 - PSI) - (LN Z2 - PSI))/((N1-N2))$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 8.23E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.339E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.99E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 3.79E-01
Z/L AT GHM -0.005	LAT. HEAT FLUX (Watts/m2) 2.03E 02	SCALING POT. TEMP. (Kelvin) -3.330E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.53E 03
Z/L AT 10 METERS -0.004	SFN. HEAT FLUX (Watts/m2) 4.37E 01	ROUGHNESS LENGTH (Meters) 3.386E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.68E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.62E 01
Z/L AT Z1 -0.003	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 5.086E-03		N=LN TEMP. STRUC. (K/M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.62E 02			
MUNIN-ORUKHOV LENGTH (Meters) -2.418E 03	BOWEN RATIO (no units) 0.215			
PSI1 AT Z1= 0.027505 PSI1 AT Z2= 0.014023 PSI2 AT Z1= 0.016657 PSI2 AT Z2= 0.008454				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2292

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2= +/- .08F-3 Kg/Kg.

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4142E 02  
WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9854E 05

RUN NUMBER: 7905082100  
 START TIME: 21: 5:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.033	14.11	7.96	NO DATA	1010.45	13.583	-1.550	-1.452	-0.408	-0.310

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.131	13.176	13.274	8.104E-03	76.14	6.591E-03	10.666	14.009	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.017 AT GMH	MOMENTUM FLUX (Nt/m2) -3.82E-01	FRICTION VELOCITY (Meters/sec) 5.577E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.111E-01	AIR DENSITY (Kg/m3) 1.2294
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.76E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.859E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.760E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4142E 02
Z/L AT GMH -0.021	LAT. HEAT FLUX (Watts/m2) 1.67E 02	SCALING POT. TEMP. (Kelvin) -3.740E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.086E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9051E 05
Z/L AT 10 METERS -0.017	SEN. HEAT FLUX (Watts/m2) 2.59E 01	ROUGHNESS LENGTH (Meters) 6.918E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.525
MONIN-OBUKHOV LENGTH (Meters) -6.053E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.562E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.173E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.08E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.65
	BOWEN RATIO (no units) 0.155			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
65%	65%	53%	130%	49%	10%	101%	179%	27%	103%	22%	47%	53%
164%	164%	46%	39%	92%	10%	33%	131%	23%	62%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905082100  
 START TIME: 21: 5:10 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.008 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -8.41E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 7.890E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.10E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.539E-05 (3.0E-05)
Z/L AT GMH -0.010 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.76E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.396E-02 (2.0E-02)
Z/L AT 10 METERS -0.008 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.75E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.986E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.305E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.076E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.21E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.180 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
35%	34%	59%	12%	25%	0%	14%	17%	32%	21%	7%	60%	58%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905082130  
START TIME: 21:35:30 PST  
END TIME: 22:54:00 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.733	4.812	8.348	7.787	4.634	-0.104	5.096

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.916	3.795	2.535	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTBFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 118145	1421 119494	0.183	92	-0.008	-0.050	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. .005V)	B(No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.80

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.814	16.03	7.95	NO DATA	318.3	1009.31	1.45E 01	13.560	285.042

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)
11.949	14.30	8.05	NO DATA	0.24	1010.41

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.994	12.956	13.136	8.095E-03	77.19	6.587E-03	10.646	13.793	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.040	13.097	13.189	8.155E-03	77.02	6.632E-03	10.739	13.931	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905082130  
START TIME: 21:35:30 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRND. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 AT GHM	MOMENTUM FLUX (Nt/m2) -1.29E 00	FRICTION VELOCITY (Meters/sec) 1.026E 00	GENERAL FORM: $DN/DZ = [(N1-N2)]/[Ln(Z1/Z2)]$ (Z1=Z2) 1/2	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 8.01E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.349E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.93E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.90E-01
Z/L AT GHM -0.006	LAT. HEAT FLUX (Watts/m2) 1.90E 02	SCALING POT. TEMP. (Kelvin) -3.595E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.51E 03
Z/L AT 10 METERS -0.005	SFN. HEAT FLUX (Watts/m2) 4.58E 01	ROUGHNESS LENGTH (Meters) 3.271E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -5.05E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.50E 01
Z/L AT Z1 -0.009	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAG COEF. AT 10 METERS (Dimensionless) 4.506E-03		N=Ln TEMP. STRUC. (K-m-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.58E 02			
MONIN-OBUKHOV LENGTH (Meters) -2.111E 03	BOWEN RATIO (no units) 0.231			
PSI1 AT Z1 = 0.031348 PSI1 AT Z2 = 0.016019 PSI2 AT Z1 = 0.019008 PSI2 AT Z2 = 0.009664				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08f -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2294
AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
WATER LAT. HEAT VAP. (ITcal./Kg) 5.9059E 05

RUN NUMBER: 7905082130  
 START TIME: 21:35:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	1-MP. STRUC. (Kelvin-M-2/3) NO DATA	BAR. PRES. (Millibars)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
11.933	14.51	8.04		1010.31	13.560	-1.627	-1.529	-0.478	-0.380

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3) NO DATA
10.00	12.031	13.082	13.180	8.148E-03	77.04	6.626E-03	10.720	13.915	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.016 AT GMH	MOMENTUM FLUX (Nt/m2) -4.11E-01	FRICTION VELOCITY (Meters/sec) 5.782E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.343E-01	AIR DENSITY (Kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.83E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.606E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.829E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMH -0.021	LAT. HEAT FLUX (Watts/m2) 1.69E 02	SCALING POT. TEMP. (Kelvin) -3.876E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.241E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9056E 05
Z/L AT 10 METERS -0.016	SEN. HEAT FLUX (Watts/m2) 2.79E 01	ROUGHNESS LENGTH (Meters) 7.776E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.500
MONIN-OBUKHOV LENGTH (Meters) -6.275E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.588E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.11E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.51
	BOWEN RATIO (no units) 0.165			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
67%	67%	56%	131%	49%	10%	101%	180%	28%	103%	21%	48%	56%
163%	163%	46%	39%	91%	10%	34%	130%	23%	62%	114%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905082130  
 START TIME: 21:35:30 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -8.10E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 7.804E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.10E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.383E-05 (3.0E-05)
Z/L AT GMH -0.010 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.76E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.639E-02 (2.0E-02)
Z/L AT 10 METERS -0.008 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.95E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.956E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.251E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 2.838E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.23E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.193 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
31%	30%	55%	9%	24%	0%	12%	17%	29%	20%	5%	64%	54%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7705080276  
START TIME: 22:55:00 PST  
END TIME: 23:00:00 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (COVER PAGE VDC):

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND DIR. 10	WIND DIR. 11	WIND DIR. 12	WIND DIR. 13	WIND DIR. 14	WIND DIR. 15	WIND DIR. 16	WIND DIR. 17	WIND DIR. 18
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* DIGITAL CHANNEL RAW DATA (COVER PAGE):

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
WIND DIR. 19	WIND DIR. 20	WIND DIR. 21	WIND DIR. 22	WIND DIR. 23	WIND DIR. 24	WIND DIR. 25	WIND DIR. 26	WIND DIR. 27
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* SYSTEM A CORRECTED PARAMETERS (TRANSLATED INTO ENGINEERING UNITS):

PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000	WIND DIR. 2	(Degrees)	0.000	WIND DIR. 3	(Degrees)	0.000

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CORRECTED AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000	WIND DIR. 2	(Degrees)	0.000	WIND DIR. 3	(Degrees)	0.000

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000	WIND DIR. 2	(Degrees)	0.000	WIND DIR. 3	(Degrees)	0.000

## \* CONTINUED BELOW

RUN NUMBER: 7705080276  
START TIME: 22:55:00 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PARALLEL CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (USING P, 1973):

PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000	WIND DIR. 2	(Degrees)	0.000	WIND DIR. 3	(Degrees)	0.000

## \* GENERAL CONSTANTS:

PARAMETER	UNIT	DATA	PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000	WIND DIR. 2	(Degrees)	0.000

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation exceeded by insertion of.

WIND DIR. 1 = 0.000

## \* MISCELLANEOUS

PARAMETER	UNIT	DATA
WIND DIR. 1	(Degrees)	0.000

## \* CONTINUED ON NEXT PAGE



RUN NUMBER: 7505082200  
 START TIME: 22: 5:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	U. POT-WT TEMP. (Kelvin)
11.904	15.37	8.04	NO DATA	1010.06	13.542	-1.638	-1.540	-0.489	-0.391

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.002	13.054	13.152	8.156E-03	77.20	6.634E-03	10.730	13.865	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014 AT GMH	MOMENTUM FLUX (Nt/m2) -4.78E-01	FRICTION VELOCITY (Meters/sec) 6.235E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.888E-01	AIR DENSITY (Kg/m3) 1.2295
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.377E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.188E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4143E 02
Z/L AT GMH 0.918	LAT. HEAT FLUX (Watts/m2) 1.78E 02	SCALING POT. TEMP. (Kelvin) -3.815E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.379E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9058E 05
Z/L AT 10 METERS 0.613	SEN. HEAT FLUX (Watts/m2) 2.96E 01	ROUGHNESS LENGTH (Meters) 9.882E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.478
MONTIN-OBUKHOV LENGTH (Meters) -7.413E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.645E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.170E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.22E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.26
	BOWEN RATIO (no units) 0.166			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
67%	67%	55%	131%	50%	10%	102%	181%	28%	103%	22%	48%	55%
162%	162%	46%	39%	90%	10%	34%	130%	23%	62%	113%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7505082200  
 START TIME: 22: 5:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.007 (0.12) AT GMH	MOMENTUM FLUX (Nt/m2) -9.29E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.371E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.50E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 8.234E-05 (3.0E-05)
Z/L AT GMH 0.909 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.85E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.482E-02 (2.0E-02)
Z/L AT 10 METERS 0.607 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.05E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.184E-03 (6.0E-05)
MONTIN-OBUKHOV LENGTH (Meters) -7.69E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 2.88E-03 (1.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.34E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.109 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. PROF. GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
76%	76%	54%	10%	22%	6%	12%	15%	28%	19%	7%	58%	52%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905082230  
START TIME: 22:35:10 PST  
END TIME: 23:02:00 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES. 2	SKY RAD.	WIND DIR
6.205	0.001	0.001	4.732	4.809	9.032	8.331	4.625	0.114	5.727
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZIRK REF.	SPARE A	SPARE B	VOLT. REF. B		
3.873	3.785	2.542	0.001	0.001	0.001	0.001	6.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1 CAL	DP2 CAL	W1 CAL	W2 CAL	W3 CAL	W4 CAL
WIND DIR. 1	WIND DIR. 2	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 117936	1421 119269	0.179	0.2	-0.008	-0.058	0.300	0.390	0.390	0.390

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DEV	VOLT. REF. DEV	ZIRK REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLT. FLUX	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	18	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DEW POINT1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	AIR TEMP.
(Celsius)	(meters/sec)	(Celsius)	(km-xm-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
11.794	17.34	7.95	NO DATA	322.5	1009.17	1.45E-01	13.519	11.794
AIR TEMP. 2	WIND SPEED2	DEW POINT2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(meters/sec)	(Celsius)	(km-xm-2/3)	(Meter NSL)	(Millibar)			
11.927	15.46	8.63	NO DATA	-0.07	1015.27			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
10.35	11.973	12.934	13.114	8.692E-03	77.27	6.585E-03	10.641	13.772	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.29	10.017	13.075	13.165	8.142E-03	77.02	6.622E-03	10.713	13.909	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905082230  
START TIME: 22:35:10 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUBINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, WITH HEIGHT)
GRAV. RICHARDSON NUMBER (+ Stable, - Unstable) 0.004 AT 0.001	MOMENTUM FLUX (N/m2) -1.61E-06	FRICTION VELOCITY (Meters/sec) 1.146E-06	GENERAL FORM: DN/DZ = 1/(N1-N2) * 1/(1+(Z1/Z2)^2) * (Z1^2 Z2^2) / (Z1^2 + Z2^2)	GENERAL FORM: DSLOPE = 1/(1.621 PSI1) * (1.621 PSI1 / (1 - N1^2))
GRADIENT WIND HEIGHT (Meters) 0.01 (Z1^2 Z2^2) / (Z1^2 + Z2^2) 12.79	HUMIDITY FLUX (Kg/sec m2) 0.97E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.330E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DS/DZ = 2.17E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 3.49E-01
Z/L AT 0.001	LAT. HEAT FLUX (Watts/m2) 2.21E-02	SCALING POT. TEMP. (Kelvin) 3.450E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = -8.54E-03
Z/L AT 10 METERS -0.004	SIN. HEAT FLUX (Watts/m2) 4.91E-01	ROUGHNESS LENGTH (Meters) 3.629E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -4.85E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = -1.51E-01
Z/L AT Z1 -0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEF. AT 10 METERS (Dimensionless) 4.848E-03		
Z/L AT Z2 0.503	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.94E-02			
MINI-BUBKHOF LENGTH (Meters) -2.752E-03	BOWEN RATIO (no units) 0.223			
PS11 AT Z1 = 0.024260 PS11 AT Z2 = 0.012345 PS12 AT Z1 = 0.014676 PS12 AT Z2 = 0.007438				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (m/sec^2)	PRANDTL NUMBER	PROF. SCHMIDT NUMBER	BULK SIN. HEAT TRANSF. COEF.	BULK HUMIDITY TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2294

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivatives.  
Computation executed by interpolation of:

SHL SHL = 2.08E-03 Kg/Kg

AIR SPECIFIC HEAT  
(J/Kg-Kelvin)  
2.4145E-02

WATER LAT. HEAT CAP  
(J/Kg)  
5.9961E-01

RUN NUMBER: 7905082210  
 START TIME: 22:36:10 PST  
 START DATE: 8 May 1979 (DAY 28)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 0.7/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DPW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.911	15.63	8.02	NO DATA	1010.17	13.519	-1.608	-1.510	-1.461	-0.363

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	V. VAP. PRES. (Millibars)	REF. INDEX (Kelvin 2/3)
10.00	12.009	13.058	13.156	8.136E-03	77.95	6.617E-03	10.704	13.893	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.013 AT GMH	MOMENTUM FLUX (Nt/m2) -4.99E-01	FRICTION VELOCITY (Meters/sec) 6.372E-01	WITH LONG. VELOCITY (Meter2/sec2) -4.66E-01	AIR DENSITY (Kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.32E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.338E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 7.310E-05	AIR SPECIFIC HEAT (J/cal./Kg) 2.4143E 02
Z/L AT GMH -0.016	LAT. HEAT FLUX (Watts/m2) 1.81E 02	SCALING POT. TEMP. (Kelvin) -3.722E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.372E-02	WATER LAT. HEAT VAP. (J/cal./Kg) 5.9059E 05
Z/L AT 10 METERS -0.013	SEN. HEAT FLUX (Watts/m2) 2.95E 01	ROUGHNESS LENGTH (Meters) 1.052E-03		VAP. PRES. AT WT LEVEL (Millibar) 15.456
MONIN-OBUKHOV LENGTH (Meters) -7.935E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAO COEF. AT 10 METERS (Dimensionless) 1.652E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.168E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.25E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.27
	BOWEN RATIO (no units) 0.163			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "4-sigma":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAO COEF.
65%	65%	54%	130%	49%	10%	101%	179%	27%	163%	28%	47%	54%
163%	163%	46%	39%	91%	10%	34%	130%	23%	62%	114%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905082210  
 START TIME: 22:36:10 PST  
 START DATE: 8 May 1979 (DAY 12R)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 0.7/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.006 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.01E 00 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.716E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 7.69E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.202E-05 (3.0E-05)
Z/L AT GMH -9.908 (0.32)	LAT. HEAT FLUX (Watts/m2) 1.90E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 3.494E-02 (2.0E-02)
Z/L AT 10 METERS -0.006 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.23E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.287E-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.612E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 (2.0E+01)	DRAO COEF. AT 10 METERS (Dimensionless) 3.00E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.40E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.168 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "4-sigma":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAO COEF.
25%	24%	55%	12%	24%	0%	14%	16%	29%	19%	5%	56%	58%

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

FILE NUMBER: 196508-300  
START TIME: 05:30 PM  
END TIME: 05:35:40 PM  
DATE: 01 May 1972 (DAR 123)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

[illegible]

WIND	WIND	UPWIND NEAR	UPWIND FARB	DPHFAL	DPHFAL	WTFHCL	WSHCL	WS2CL
(m/s)	(m/s)	HEIGHT (m)	HEIGHT (m)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1.0	1.0	14.1	11.0	0.105	0.108	0.009	0.992	0.952

AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No.) (VAC)	(No.) (Hz)	(VAC)	(Hz)
1	1	115.3	59.81

WIND DIR.1 (meter/sec)	WIND DIR.1 (meter/sec)	WIND DIR.1 (meter/sec)	WIND DIR.1 (meter/sec)	WIND DIR. (deg./true)	BAR.PRES.1 (millibar)	SKY RAD. (Watt/m2)	BULK WT TEMP (Celsius)	MEAN AIR TEMP (Kelvin)
11.000	11.000	11.000	11.000	339.6	1009.34	1.45E 01	13.496	284.976
WIND DIR.2 (meter/sec)	WIND DIR.2 (meter/sec)	WIND DIR.2 (meter/sec)	WIND DIR.2 (meter/sec)	WIND DIR. (deg./true)	BAR.PRES.2 (millibar)	SKY RAD. (Watt/m2)	BULK WT TEMP (Celsius)	MEAN AIR TEMP (Kelvin)
11.000	11.000	11.000	11.000	339.6	1010.14	1.45E 01	13.496	284.976

11/19/2017, 21 (Celsius) 11/19/2017	POT_TEMP_1 (Celsius) 11/19/2017	WTR_TEMP_1 (Celsius) 17.985	VAP_TEMP_1 (Celsius) 15.105	ABS_HUMID_1 (kg/m3) 8.248E-03	REL_HUMID_1 (Percent) 78.61	SPEC_HUMID_1 (kg/kg) 6.679E-03	VAP_PRES_1 (Millibar) 10.792	S_VAP_PRES_1 (Millibar) 13.729	REF_INDEX_1 (kelvin/2/3) NO DATA
11/19/2017, 22 (Celsius) 11/19/2017	POT_TEMP_2 (Celsius) 11/19/2017	WTR_TEMP_2 (Celsius) 17.048	VAP_TEMP_2 (Celsius) 15.148	ABS_HUMID_2 (kg/m3) 8.255E-03	REL_HUMID_2 (Percent) 78.30	SPEC_HUMID_2 (kg/kg) 6.714E-03	VAP_PRES_2 (Millibar) 10.859	S_VAP_PRES_2 (Millibar) 13.868	REF_INDEX_2 (kelvin/2/3) NO DATA

case number: 290508730  
 date filed: 2006-05-26 PM  
 filed by: B. Day 1979 (DOR 105)

MARINE SURFACE LAYER  
WRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

START FILE	FLUX PARAMETERS (+UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
HEAD INFORMATION NUMBER 0.004      AT GND	MOTION FLUX (Watts/m <sup>2</sup> ) -1.51E-06	FRICTION VELOCITY (Meters/sec) 1.11E-00	GENERAL FORM: DN/DZ= (N1-N2)/(Ln(Z1/Z2)* (Z1+Z2))/Z1	GENERAL FORM: N'SLOPE= (LnZ1-PSI)-(LnZ2-PSI))/( [N1-N2]
CORRECTION FACTOR (Center Line) Z1/Z2(1-Z2)/Z2	DENSITY FLUX (kg/cm <sup>2</sup> , m <sup>2</sup> ) 8.67E-05	SCALING SPEC.HUMID. (kg/kg) 6.339E-01	N=WIND SPEED (m/sec) Z=HEIGHT (Meters) DWS/DZ= 2.39E-01	N=WIND SPED (M/sec) Z=HEIGHT (M) Vert.Axis PSI=PSII WS SLOPE= 3.60E-01
Z=ALTITUDE 0.005	LAT.HEAT FLUX (Watts/m <sup>2</sup> ) 2.15E-02	SCALING POT. TEMP. (Kelvin) -3.709E-62	N=SPEC.HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC.HUMIDITY (kg/Kg) Z=HEIGHT (M) Vert.Axis PSI=PSI2 SH SLOPE= -8.53E-03
Z=ALTITUDE FEET 0.004	SUN HEAT FLUX (Watts/m <sup>2</sup> ) 5.11E-01	ROUGHNESS LENGTH (Meters) 3.552E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (Meters) DPT/DZ= -5.22E-03	N=POT.TEMP.(Kelvin) Z=HEIGHT (M) Vert.Axis PSI=PSI2 PTK SLOPE= -1.46E-01
Z=ALTITUDE 0.004	SEA AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	DRAW COEF. AT 10 METERS (Dimensionless) 4.944E-05		N=LnTEMP.STRUC.(KxM-2/3) Z=HEIGHT (M) Vert.Axis PSI=NONE CT2 SLOPE=N.O DATA
DRAG COEFFICIENT (Meters) 2.39E-03	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.80E-02			
HEAT ADJUSTMENT 0.0010000    0.0010000 0.0010000    0.0010000 0.0010000    0.0010000	RUBIN WATER (No units) 0.259			

TEST NUMBER	CONCRETE STRENGTH	PROFITE PER BRIDGE	PROFITE PER MILE	WORK SUN HEAT	WORK MOISTURE
TEST NUMBER	CONCRETE STRENGTH	PROFITE PER BRIDGE	PROFITE PER MILE	WORK SUN HEAT	WORK MOISTURE
1	2,200	0.74	0.74	0.921 -0.3	1.321 -0.3

Computation executed by insertion of:

<sup>a</sup>Values are means ± SD.

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2293

AIR SPECIFIC HEAT  
(11 cal./kg K<sub>01</sub>)  
2.4145E D2

WATER LAT. HEAT VAP.  
(ITcal /Kg)  
5.4263E 05

RUN NUMBER: 2905002300  
 START TIME: 03: 53: 59 PM  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

#### \* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STROC. (Kelvin 2/3) NO DATA	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
13.868	15.01	8.27		1010.04	13.496	-1.628	-1.530	-0.455	-0.367
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibar)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin 2/3) NO DATA
10.00	11.966	13.031	13.129	8.249E-03	70.34	6.709E-03	19.851	13.852	

#### \* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDT ET AL, 1970):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
UNAD. RICHARDSON NUMBER (+Stable, - Unstable) 0.015 AT GNH	MOMENTUM FLUX (N/m2) -4.49E-01	FRICTION VELOCITY (Meter/sec) 6.043E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.651E-01	AIR DENSITY (Kg/m3) 1.2290
GEOMETRIC MEAN HEIGHT (Meter) GNH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec. m2) 6.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.106E-05	WITH ABS. HUMIDITY (Meter Kg/sec. m3) 6.765E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.414E-02
Z/L AT GNH -0.019	LAT. HEAT FLUX (Watts/m2) 1.67E-02	SCALING POT. TEMP. (Kelvin) -3.827E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.312E-02	WATER LAT. HEAT VAP. (J/cal./Kg) 5.906E-05
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m2) 2.87E-01	ROUGHNESS LENGTH (Meter) 0.954E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.430
MONTIN ORSKHOV LENGTH (Meter) -5.940E-07	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.621E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.11E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.24
	BOWEN RATIO (no units) 0.172			

#### \* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE + or -

UNAD. RICH. NO. AT GNH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEC. HUMID. FLUX	SOL. POT. TEMP.	ROUGH LENGTH	DRAG COEFF.
64%	64%	53%	130%	47%	10%	160%	177%	27%	103%	20%	47%	53%
163%	163%	46%	40%	91%	10%	44%	130%	23%	63%	114%	43%	40%

#### \* CONTINUED BELOW

RUN NUMBER: 2905002300  
 START TIME: 03: 53: 59 PM  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

#### \* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
UNAD. RICHARDSON NUMBER (+Stable, - Unstable) 0.007-10.00E-01 AT GNH	MOMENTUM FLUX (N/m2) -9.41E-01 (6.0E-02)	FRICTION VELOCITY (Meter/sec) 0.309E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GNH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec. m2) 7.21E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 0.961E-05 (3.0E-05)
Z/L AT GNH -0.009-10.00E-01	LAT. HEAT FLUX (Watts/m2) 1.70E-02 (2.4E-01)	SCALING POT. TEMP. (Kelvin) -3.727E-02 (2.0E-01)
Z/L AT 10 METERS -0.007-10.00E-01	SEN. HEAT FLUX (Watts/m2) 4.35E-01 (3.0E-01)	ROUGHNESS LENGTH (Meter) 2.14E-03 (6.0E-05)
MONTIN ORSKHOV LENGTH (Meter) -1.416E-05	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 (2.0E-01)	DRAG COEFF. AT 10 METERS (Dimensionless) 0.99E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.26E-02 (3.0E-01)	
	BOWEN RATIO (no units) 0.298 (1.00)	

#### \* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABOVE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE + or -

UNAD. RICH. NO. AT GNH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEC. HUMID. FLUX	SOL. POT. TEMP.	ROUGH LENGTH	DRAG COEFF.
20%	20%	5%	1%	27%	6%	17%	17%	30%	10%	2%	61%	53%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905082330  
START TIME: 23:36:50 PST  
END TIME: 01:21:00 PST  
START DATE: 8 May 1979 (DAY 128)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CAL CHANNELS 10 MIN  
DATA AVERAGING PERIOD: 10 MIN  
NOISE FILTERING: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09	No. 10
VOLTAGE A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DW. POINT 1	DW. POINT 2	WIND DIR. 1	WIND SPEED 1	WIND DIR. 2	WIND SPEED 2	WIND DIR. 3	WIND SPEED 3
6.205	0.000	0.001	4.771	4.052	7.931	7.462	4.517	7.462	7.462	7.462
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19	No. 20
WIND DIR. 4	WIND SPEED 4	WIND DIR. 5	WIND SPEED 5	WIND DIR. 6	WIND SPEED 6	WIND DIR. 7	WIND SPEED 7	WIND DIR. 8	WIND SPEED 8	WIND DIR. 9
7.462	7.462	7.462	7.462	7.462	7.462	7.462	7.462	7.462	7.462	7.462

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED 15 METER CORRECTIONS:

No. 1	No. 2	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND	UPWIND WIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH
1411.117281	1421.11866A	9.103	1.16	9.000	9.000	9.000	9.000	9.000	9.000	9.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLTAGE	WIND DIR.	WIND SPEED	WIND DIR.	WIND SPEED	WIND DIR.	WIND SPEED	WIND DIR.	WIND SPEED
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DW. POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	WIND SPEED 1	WIND DIR. 2	WIND SPEED 2	WIND DIR. 3	WIND SPEED 3	WIND DIR. 4	WIND SPEED 4
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)
11.728	15.24	8.18	NO DATA	315.4	1009.00	1009.00	1009.00	1009.00	1009.00	1009.00	1009.00

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	WIND DIR. 1	WIND SPEED 1	WIND DIR. 2	WIND SPEED 2	WIND DIR. 3	WIND SPEED 3	WIND DIR. 4	WIND SPEED 4
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)	(Deg. True)	(Meter/sec)
19.35	11.908	12.897	13.067	315.4	1009.00	1009.00	1009.00	1009.00	1009.00	1009.00	1009.00

## \* CONTINUED BELOW

RUN NO: 7905082330  
START: 23:36:50 PST  
START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CAL CHANNELS 10 MIN  
DATA AVERAGING PERIOD: 10 MIN  
NOISE FILTERING: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILES
GRAD RICHARDSON NUMBER (+stable, -unstable) -0.007	MOMENTUM FLUX (N/m <sup>2</sup> ) -9.81E-01	FRICTION VELOCITY (meters/sec) 0.939E-01	GENERAL FORM IN DS 1.0E+01 1.0E+01 1.0E+01	GENERAL FORM IN DS 1.0E+01 1.0E+01 1.0E+01
SYMMETRIC MEAN HEIGHT (Meters) GRH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 7.0E-05	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
Z/L AT GRH -0.009	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.74E-02	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.33E-01	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
Z/L AT Z1 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
Z/L AT Z2 -0.006	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.31E-02	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
MUNIR-BOSKOV LENGTH (Meters) -1.470E-03	WIND RATIO (No. unit) 0.249	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01
PS11 AT Z1= 0.044309 PS11 AT Z2= 0.022815 PS12 AT Z1= 0.0269 PS12 AT Z2= 0.013795	WIND RATIO (No. unit) 0.249	SCALING POT. TEMP (K/m) 6.385E-01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01	WIND SPEED (M/sec) 2.0E+01 2.0E+01 2.0E+01

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) <th>GRAVITATION ACCELERATION (M/sec<sup>2</sup>) <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER </th></th></th></th></th>	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER </th></th></th></th>	PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER </th></th></th>	PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER </th></th>	PROF. TUX PRANDTL NUMBER <th>PROF. TUX PRANDTL NUMBER </th>	PROF. TUX PRANDTL NUMBER
0.4	9.7959	0.74	0.74	0.74	0.74

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile wind speed at 10 meters height.  
Computation executed by insertion of

SHI SHI = 2.0E-01 kg/kg

## \* GENERAL NOTES:

WIND SPEED (M/sec)  
2.0E+01 2.0E+01 2.0E+01

WIND SPEED (M/sec)  
2.0E+01 2.0E+01 2.0E+01

WIND SPEED (M/sec)  
2.0E+01 2.0E+01 2.0E+01

RUN NUMBER: 7905082330  
 START TIME: 23:36:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: 1000 HARMONIZED/HR  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STICK (KELVIN 2/3) NO DATA	BAR PRESS. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT. WT TEMP. (Kelvin)	VIR. WT TEMP. (Kelvin)	V. POT. WT TEMP. (Kelvin)
11.850	13.92	8.00		1010.05	13.485	-1.615	-1.512	-6.440	-6.350
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRESS. (Millibar)	S. VAP. PRESS. (Millibar)	REF. INDEX (Kelvin 2/3) NO DATA
10.00	11.748	13.017	13.115	8.282E-03	70.74	6.735E-03	10.554	13.845	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978)

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED PEAK VELOCITY COVARIANCE	MIXED HEIGHT
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 AT 10M	MOMENTUM FLUX (N/m2) -3.69E-01	FRICTION VELOCITY (Meter/sec) 5.479E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.062E-01	AIR DENSITY (Kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (Meter) GHH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.17E-05	SCALING SPEC. HUMID. (Kg/Kg) -2.168E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.175E-05	AIR SPECIFIC HEAT (J/cal/Kg Kelv) 2.414E-02
Z/L AT 10M -0.023	LAT. HEAT FLUX (Watts/m2) 1.53E-02	SCALING POT. TEMP. (Kelvin) -3.912E-02	WITH POT. TEMPERATURE (Meter Kelv/sec) 2.143E-02	WATER LAT. HEAT VAP. (J/cal/Kg) 5.960E-05
Z/L AT 10 METERS -0.018	SIN. HEAT FLUX (Watts/m2) 2.66E-01	ROUGHNESS LENGTH (Meter) 6.525E-04		VAP. PRESS. AT WT LEVEL (Millibar) 15.400
MONIN-ORUKHOV LENGTH (Meters) -5.581E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.549E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.364E-01
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.94E-02			VAP. PRESS. AT WT LEVEL (Millibar) 14.112
	BOWEN RATIO (no units) 0.174			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT UNCERTAINTIES. TOP ROW ARE PROFILE 1 FROM VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE + or - 1 SD

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEC. HUMID. HUMIDITY	POT. TEMP.	ROUGH LENGTH	DRAW COEF.
71%	71%	62%	135%	51%	10%	101%	180%	31%	104%	20%	51%	5%
163%	163%	46%	40%	91%	10%	34%	131%	25%	65%	114%	45%	3%

\* CONTINUED BELOW

RUN NUMBER: 7905082330  
 START TIME: 23:36:50 PST  
 START DATE: 8 May 1979 (DAY 128)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: 1000 HARMONIZED/HR  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 (0.02) AT 10M	MOMENTUM FLUX (N/m2) -6.31E-01 (6.0E-02)	FRICTION VELOCITY (Meter/sec) 6.929E-01 (6.0E-01)
GEOMETRIC MEAN HEIGHT (Meter) GHH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.37E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 0.117E-05 (3.0E-05)
Z/L AT 10M -0.013 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.57E-02 (2.6E-03)	SCALING POT. TEMP. (Kelvin) -3.876E-02 (2.0E-02)
Z/L AT 10 METERS -0.010 (0.02)	SIN. HEAT FLUX (Watts/m2) 3.73E-01 (5.0E-01)	ROUGHNESS LENGTH (Meter) 1.549E-03 (6.0E-04)
MONIN-ORUKHOV LENGTH (Meters) -9.837E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 (2.0E-01)	DRAW COEF. AT 10 METERS (Dimensionless) 1.466E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.04E-02 (3.0E-03)	
	BOWEN RATIO (no units) 0.205 (0.09)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER APPROACH VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE + or - 1 SD

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEC. HUMID. HUMIDITY	POT. TEMP.	ROUGH LENGTH	DRAW COEF.
31%	36%	49%	8%	23%	0%	10%	10%	25%	10%	6%	6%	5%





NO. 1000000  
DATE: 11 JUN 1980  
TIME: 0000Z  
DAY: 1980 JUN 12

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND SPEED	(Meters/sec)	15.33	TEMP. STRUCT.	(Kelvin-2/3)	NO DATA
WIND DIR.	(Degrees)	104	BAR. PRES.	(Millibar)	1010.25
REL. HUMID.	(Percent)	79.46	BULK WT TEMP	(Celsius)	13.436
AIR WT TEMP	(Kelvin)	-1.581	POT. WT TEMP	(Kelvin)	-1.483
VIR. WT TEMP	(Kelvin)	-0.402	V. POT. WT TEMP	(Kelvin)	-0.304
REF. INDEX	(Kelvin-2/3)	NO DATA			

\* BULK AERODYNAMIC COEFFICIENTS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND SPEED	(Meters/sec)	15.33	WIND DIR.	(Degrees)	104
REL. HUMID.	(Percent)	79.46	AIR WT TEMP	(Kelvin)	-1.581
VIR. WT TEMP	(Kelvin)	-0.402	V. POT. WT TEMP	(Kelvin)	-0.304
REF. INDEX	(Kelvin-2/3)	NO DATA			

\* AVERAGE STANDARD DEVIATION OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE FOLLOWING PERCENT ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "FOR-":

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND SPEED	(Meters/sec)	15.33	WIND DIR.	(Degrees)	104
REL. HUMID.	(Percent)	79.46	AIR WT TEMP	(Kelvin)	-1.581
VIR. WT TEMP	(Kelvin)	-0.402	V. POT. WT TEMP	(Kelvin)	-0.304
REF. INDEX	(Kelvin-2/3)	NO DATA			

\* ESTIMATED ERROR

NO. 1000000  
DATE: 11 JUN 1980  
TIME: 0000Z  
DAY: 1980 JUN 12

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS (FRIEHE ET AL, 1978):

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND SPEED	(Meters/sec)	15.33	WIND DIR.	(Degrees)	104
REL. HUMID.	(Percent)	79.46	AIR WT TEMP	(Kelvin)	-1.581
VIR. WT TEMP	(Kelvin)	-0.402	V. POT. WT TEMP	(Kelvin)	-0.304
REF. INDEX	(Kelvin-2/3)	NO DATA			

\* AVERAGE STANDARD DEVIATION OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE CONSTITUENT MEASUREMENT ACCURACIES OR AERODYNAMIC ERROR VALUES (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE APPROXIMATE AND ARE "FOR-":

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND SPEED	(Meters/sec)	15.33	WIND DIR.	(Degrees)	104
REL. HUMID.	(Percent)	79.46	AIR WT TEMP	(Kelvin)	-1.581
VIR. WT TEMP	(Kelvin)	-0.402	V. POT. WT TEMP	(Kelvin)	-0.304
REF. INDEX	(Kelvin-2/3)	NO DATA			

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905090030  
START TIME: 0:37:30 PST  
END TIME: 1: 7:40 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 100 CHANNELS/SEC  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DW. POINT 1	DW. POINT 2	WIND SPEED 1	WIND SPEED 2	DW. POINT 3	WIND SPEED 3	WIND SPEED 4
6.265	0.000	0.001	4.871	4.900	7.901	7.411	4.614	0.000	0.000
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT. TEMP.	AIR FREQUENCY	AIR VOL. FREQ.	MANUAL FLAG	ZERO KEY	SPARE A	SPARE B	VOLT. REF. E	SPARE C	SPARE D
3.704	3.775	2.541	0.401	0.001	0.001	0.001	7.295	0.000	0.000

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCORTMENT DATA, FIELD CALIBRATION AND WIND SPEED CALIBRATION DATA

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
AIR TEMP. 1	AIR TEMP. 2	AIR TEMP. 3	AIR TEMP. 4	AIR TEMP. 5	AIR TEMP. 6	AIR TEMP. 7	AIR TEMP. 8	AIR TEMP. 9
11.692	11.824	14.01	11.824	11.824	11.824	11.824	11.824	11.824

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA GATE	VOLT. REF. 1	VOLT. REF. 2	DW. POINT 1	DW. POINT 2	DW. POINT 3	DW. POINT 4	DW. POINT 5
0	0	180	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE TWO AND ESCORTMENT DATA) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DW. POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	DW. POINT 2	WIND SPEED 2	WIND DIR. 2	DW. POINT 3	WIND SPEED 3
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
11.692	15.18	0.40	NO DATA	NO DATA	11.824	15.18	0.40	NO DATA	NO DATA

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	WIND SPEED 1	WIND DIR. 1	WIND SPEED 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Percent)	(kg/kg)	(Meter/sec)	(Celsius)	(Meter/sec)
18.35	11.862	12.865	15.040	0.375	0.71	0.006	15.18	0.40	15.18

\* CONTINUED BELOW

RUN NUMBER: 7905090030  
START TIME: 0:37:30 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 100 CHANNELS/SEC  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (HUSINGER, 1973):

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILES
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.007 AT GMM	MOMENTUM FLUX (N/m <sup>2</sup> ) -8.93E-01	FRICITION VELOCITY (Meters/sec) 0.522E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/(1/(Z1/Z2) <sup>2</sup> + (Z1/Z2) <sup>3</sup> )	GENERAL FORM: N SLOPE = 1/(N1-N2)/(1/(Z1/Z2) <sup>2</sup> + (Z1/Z2) <sup>3</sup> )
GEOMETRIC MEAN HEIGHT (Meters) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec/m <sup>2</sup> ) 6.70E-05	SCALING COEFF. HUND. (kg/kg) 0.396E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = -8.92E-06	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1-PS12 WS SLOPE = 0.69E-01
Z/L AT GMM -0.010	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.65E-02	SCALING POT. TEMP. (Kelvin) -3.865E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert Axis PS1-PS12 SH SLOPE = 0.45E-03
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.09E-01	ROUGHNESS LENGTH (Meters) 0.334E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -5.39E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1-PS12 PTR SLOPE = 1.49E-01
Z/L AT Z1 -0.014	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	DRAW CODE AT 10 METERS (Dimensionless) -5.55E-03		
Z/L AT Z2 -0.007				
MONIN-OBUKHOF LENGTH (Meters) -1.343E-03	TOTAL HEAT FLUX (Watts/m <sup>2</sup> ) 2.21E-02			
PS11 AT Z1 = 0.648253 PS11 AT Z2 = 0.024982 PS12 AT Z1 = 0.029413 PS12 AT Z2 = 0.015048	BOWEN RATIO (no units) 0.747			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.7979	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.94E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2294

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- 0.01 3 Kg/Kg.

AIR SPECIFIC HEAT  
(Cal./kg. Kel.)  
2.4143E-02

WATER LAT. HEAT VAP.  
(Cal./kg.)  
5.9267E-04

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090030  
 START TIME: 0:37:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel x M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V POT-WT TEMP. (Kelvin)
11.864	13.93	8.57	NO DATA	1010.01	13.400	-1.596	-1.493	-0.406	-0.308

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel x M-2/3)
10.00	11.902	12.994	13.092	8.447E-03	80.54	6.670E-03	11.109	13.793	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 AT 6MH	MOMENTUM FLUX (Nt/m2) -3.70E-01	FRICTION VELOCITY (Meters/sec) 5.483E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.066E-01	AIR DENSITY (Kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.77E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.584E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.787E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.414E-02
Z/L AT 6MH -0.023	LAT. HEAT FLUX (Watts/m2) 1.43E-02	SCALING POT. TEMP. (Kelvin) -3.866E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.119E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.904E-05
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 7.63E-01	ROUGHNESS LENGTH (Meters) 6.541E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.334
MONIN-OBUKHOV LENGTH (Meters) -5.655E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.549E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.159E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.84E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.21
	BOWEN RATIO (no units) 0.184			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
74%	74%	65%	136%	53%	10%	103%	189%	32%	104%	20%	52%	65%
163%	163%	46%	41%	91%	10%	34%	132%	23%	64%	114%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090030  
 START TIME: 0:37:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.011 [0.02] AT 6MH	MOMENTUM FLUX (Nt/m2) -5.87E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.746E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.98E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.757E-05 [3.0E-05]
Z/L AT 6MH -0.014 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.48E-02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.865E-02 [2.0E-02]
Z/L AT 10 METERS -0.011 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.56E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.412E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -9.413E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.314E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.93E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.210 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
28%	27%	45%	9%	21%	0%	11%	15%	23%	15%	0%	60%	44%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905090100  
START TIME: 11:25:00 PST  
END TIME: 11:30:00 PST  
START DATE: 9 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT REF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
5.205	0.000	0.001	4.104	4.882	7.810	7.295	4.616	-0.104	5.099

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B
3.223	3.776	2.530	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	IN WIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTFCAL	WS1EC	WS2EC
HT. TEMP.1	HT. TEMP.2	HEIGHT/LENGTH	PATH(METER)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411.117247	1421.116591	0.183	125	-0.008	-0.050	0.030	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

PARALL. FLAG	ERROR COUNT	DATA RATE	VOLT.REF.DEV	VOLT.REF.DEV	ZERO REF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	1	129	0	0	0	0	0	115.3	57.78

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

HT. TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.725	13.30	8.38	NO DATA	318.4	1009.94	1.45E 01	13.372	284.952

HT. TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)
11.859	13.55	8.47	NO DATA	-0.65	1010.14

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V. POT. TEMP.1	ABS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	11.905	12.877	13.079	8.33E-03	79.91	6.780E-03	10.954	13.708	NO DATA

HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V. POT. TEMP.2	ABS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	11.949	13.042	13.152	8.390E-03	79.71	6.774E-03	11.036	13.645	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090100  
START TIME: 11:25:00 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.006 AT CMH	MOMENTUM FLUX (Nt/m2) -9.33E-01	FRICTION VELOCITY (Meters/sec) 8.713E-01	GENERAL FORM: DN/DZ= ((N1-N2)/((N1+Z1)/Z2)) (Z1+Z2)/Z2	GENERAL FORM: 'N' SLOPE= ((LnZ1-PSI1)-(LnZ2-PSI1))/ (N1-N2)
ISOPHYTIC MEAN HEIGHT (Meter) CMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.84E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.381E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.63E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 4.59E-01
Z/L 0.0	LAT. HEAT FLUX (Watts/m2) 1.69E 02	SCALING POT. TEMP. (Kelvin) -3.56E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.47E 03
Z/L AT 11 -0.007	SEN. HEAT FLUX (Watts/m2) 3.86E 01	ROUGHNESS LENGTH (Meters) 2.451E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -4.98E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -1.57E 01
Z/L AT Z1 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 3.85E-03		N=LnTEMP.STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.006	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.22E 02			
MOMENTUM FLUX LENGTH (Meters) -1.726E 03	BOWEN RATIO (no units) 0.248			
PSI1 AT Z1= 0.042767 PSI1 AT Z2= 0.32001 PSI2 AT Z1= 0.026025 PSI2 AT Z2= 0.01530				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE THERMAL PRANDTL NUMBER	PROFILE THERMAL SCHMIDT NUMBER	BULK SEA HEAT TRANSFER COEFF.	BULK MOISTURE TRANSFER COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2: 17-1.001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2293

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4147E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9864E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090100  
 START TIME: 1: 7:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3) NO DATA	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.843	13.72	8.46		1010.04	13.372	-1.529	-1.431	-0.348	-0.250

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3) NO DATA
10.00	11.941	13.024	13.122	8.384E-03	79.74	6.810E-03	11.027	13.829	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FKIEHF ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP,-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 AT 6M	MOMENTUM FLUX (Nt/m2) -3.56E-01	FRICTION VELOCITY (Meters/sec) 5.377E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.891E-01	AIR DENSITY (Kg/m3) 1.2295
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.70E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.744E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.781E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4147E 02
Z/L AT 6M -0.023	LAT. HEAT FLUX (Watts/m2) 1.43E 02	SCALING POT. TEMP. (Kelvin) -3.732E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.007E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9062E 05
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 2.49E 01	ROUGHNESS LENGTH (Meter) 6.135E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.307
MONIN-BRUKHOV LENGTH (Meters) -5.835E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.536E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.158E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.82E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.24
	ROMEN RATIO (no units) 0.174			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
73%	73%	62%	135%	53%	10%	103%	188%	31%	104%	22%	51%	62%
165%	165%	46%	41%	93%	10%	34%	133%	23%	64%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090100  
 START TIME: 1: 7:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP,-DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.010 [0.02] AT 6M	MOMENTUM FLUX (Nt/m2) -6.01E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.793E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.07E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.847E-05 [3.0E-05]
Z/L AT 6M -0.013 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.49E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.592E-02 [2.0E-02]
Z/L AT 10 METERS -0.010 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.37E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.452E-03 [6.0E-05]
MONIN-BRUKHOV LENGTH (Meters) -1.002E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E 01 [2.0E+01]	DRAG COEF. AT 10 METERS (Meters) 2.427E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.92E 02 [3.0E+01]	
	ROMEN RATIO (no units) 0.197 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED POSITIVE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
31%	30%	49%	16%	21%	0%	12%	14%	25%	15%	3%	64%	48%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905090130  
START TIME: 1:38:10 PST  
END TIME: 2: 8:20 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
8.205	0.000	0.001	4.773	4.852	8.570	7.901	4.509	-6.104	5.077

No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.685	3.775	2.531	0.001	0.001	0.001	0.001	6.205

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	WTFCAL	WS1EC	WS2EC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 116616	1421 118002	0.183	156	-0.008	-0.050	0.009	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .002V)	(No. .5V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.77

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.662	16.46	8.20	NO DATA	315.9	1308.61	1.46E 01	13.336	284.891

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)
11.800	14.66	8.30	NO DATA	-0.67	1009.71

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	11.841	12.821	13.001	8.270E-03	79.27	6.697E-03	10.816	13.645	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.20	11.890	12.969	13.058	8.289E-03	79.08	6.742E-03	10.901	13.705	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090130  
START TIME: 1:38:10 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.005 AT GMM	MOMENTUM FLUX (Nt/m2) -1.40E 06	FRICTION VELOCITY (Meters/sec) 1.067E 00	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1+Z2)/2$	GENERAL FORM: $N'SLOPE = [(LnZ1-PS1)-(LnZ2-PS1)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 8.33E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.347E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 2.81E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 3.75E-01
Z/L AT GMM -0.006	LAT. HEAT FLUX (Watts/m2) 2.06E 02	SCALING POT. TEMP. (Kelvin) -3.881E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.51E 03
Z/L AT 10 METERS -0.005	SEN. HEAT FLUX (Watts/m2) 5.15E 01	ROUGHNESS LENGTH (Meters) 3.426E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -5.45E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTX SLOPE = -1.35E 01
Z/L AT Z1 -0.007	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 4.694E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.004	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.72E 02			
MONIN-OBUKHOV LENGTH (Meters) -2.114E 03	BOWEN RATIO (no units) 0.250			
PS11 AT Z1 = 0.031311 PS11 AT Z2 = 0.015999 PS12 AT Z1 = 0.018985 PS12 AT Z2 = 0.009632				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2291

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.414E 02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9968E 05

RUN NUMBER: 7905090130  
 START TIME: 1:38:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.793	14.87	8.28	NO DATA	1009.61	13.336	-1.552	-1.454	-0.385	-0.287

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	11.881	12.951	13.049	8.282E-03	79.10	6.737E-03	10.891	13.769	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.014 AT 10M	MOMENTUM FLUX (Nt/m2) -4.38F-01	FRICTION VELOCITY (Meters/sec) 5.971E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.565E-01	AIR DENSITY (Kg/m3) 1.2293
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.41E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.726E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.405E-05	AIR SPECIFIC HEAT (JCal./Kg K-1) 2.4144E-02
Z/L AT 10M -0.018	LAT. HEAT FLUX (Watts/m2) 1.58E-02	SCALING POT. TEMP. (Kelvin) -3.668E-02	WITH POT. TEMPERATURE (Meter K-1./sec) 2.190E-02	WATER LAT. HEAT VAP. (JCal./Kg) 5.9065E-05
Z/L AT 10 METERS -0.014	SEN. HEAT FLUX (Watts/m2) 2.72E-01	ROUGHNESS LENGTH (Meters) 8.622E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.264
MONIN-OBUKHOV LENGTH (Meters) -7.069E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.612F-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.154E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.00E-02			BAR. PRES. AT WT LEVEL (Millibar) 1010.81
	BOWEN RATIO (no units) 0.172			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
65%	65%	55%	131%	47%	10%	99%	178%	28%	103%	28%	48%	55%
164%	164%	46%	40%	92%	10%	34%	133%	23%	63%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090130  
 START TIME: 1:38:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.007 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -8.76E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.112E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.84E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.824E-05 (3.0F-05)
Z/L AT 10M -0.018 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.70E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.850E-02 (2.0E-02)
Z/L AT 10 METERS -0.007 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.33F-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.080F-03 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.353E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0F+01)	DRAG COEFF. AT 10 METERS (Meters) 2.989F-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.19F-02 (3.6E+01)	
	BOWEN RATIO (no units) 0.205 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
26%	26%	55%	16%	29%	0%	18%	19%	29%	16%	3%	62%	54%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905090200  
START TIME: 21:00:30 PST  
END TIME: 21:38:40 PST  
START DATE: 9 May 1977 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.771	4.848	0.054	7.512	4.605	-0.104	5.185
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.782	5.786	2.540	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No.1	No.2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FCAL	W3FCAL	W4FCAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.14647	1421.117876	0.199	110	-0.008	0.050	0.000	0.992	0.949	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	100	0	0	0	0	0	115.3	59.79

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(meters/sec)	(Celsius)	(Kelvin-273)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
11.647	15.47	8.18	NO DATA	321.3	1098.86	1.45E-01	13.332	284.875
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(meters/sec)	(Celsius)	(Kelvin-273)	(Meter MSL)	(Millibar)			
11.783	15.91	8.27	NO DATA	-0.65	1069.96			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
0.35	11.827	12.805	12.985	8.222E-03	79.26	6.690E-03	10.807	13.635	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
9.71	11.873	12.948	13.039	8.274E-03	79.02	6.729E-03	10.683	13.773	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090200  
START TIME: 21:00:30 PST  
START DATE: 9 May 1977 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUDINGER, 1973):

STABILITY	FLUX PARAMETERS (+DOWN, -UPDOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
CHAD RICHARDSON NUMBER (+stable, -unstable) 0.006	MOMENTUM FLUX (N/m2) 1.08E-01	FRICTION VELOCITY (meters/sec) 9.357E-01	GENERAL FORM: $DW/DZ = (N1-N2)/(1+N1Z1/Z2) + (Z1*Z2)/(1+Z1)$	GENERAL FORM: $N/SLOPE = [(LnZ1-PS1) - (LnZ2-PS2)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (meters) $(Z1+Z2)/2$ 12.59	HUMIDITY FLUX (kg/sec/m2) 2.43E-04	SLALING POT. HUMID. (kg/kg) 6.369E-03	N-WIND SPEED (M/sec) Z-HEIGHT (meters) $DWS/DZ = 1.75E-01$	N-WIND SPEED (M/sec) Z-HEIGHT (m) Vert. Axis $PS1-PS2$ WS SLOPE = 4.27E-01
Z/L AT GMM 0.008	LAT HEAT FLUX (Watt/m2) 1.81E-02	SCALING POT. TEMP. (kelvin) 3.676E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (meters) $DSH/DZ = -8.92E-06$	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (m) Vert. Axis $PS1-PS2$ SH SLOPE = -8.45E-03
Z/L AT 10 METERS 0.006	SUN HEAT FLUX (Watt/m2) 4.08E-01	ROUGHNESS LENGTH (meters) 2.827E-03	N-POT. TEMP. (kelvin) Z-HEIGHT (meters) $DPT/DZ = -5.15E-03$	N-POT. TEMP. (kelvin) Z-HEIGHT (m) Vert. Axis $PS1-PS2$ PTK SLOPE = 1.47E-01
Z/L AT Z2 0.005	SUN AND SOLAR HEAT FLUX (Watt/m2) 1.45E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 4.11E-03		N-TEMP. STRUCT. (km-2/3) Z-HEIGHT (m) Vert. Axis $PS1-NONE$ LT2 SLOPE=NO DATA
RONIN GEOMETRIC MEAN (meters) 1.710E-03	TOTAL HEAT FLUX (Watt/m2) 2.34E-01			
PS1 AT Z1 = 0.006372 PS2 AT Z2 = 0.019670 PS1 AT Z1 = 0.023319 PS2 AT Z2 = 0.011993	BOWEN RATIO (no. units) 0.736			

## \* GENERAL CONSTANTS

CON. KORMAN	EVAPORATION PROFILE	PROF. COEFF.	RULK	RULK
CONSTANT	AT CALIBRATION	FLUX PARAMETER	FLUX PARAMETER	FLUX PARAMETER
(no. units)	(no. units)	NUMBER	NUMBER	NUMBER
0.4	9.797E-01	0.74	0.74	0.74

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m3)  
1.2295

## \* GENERAL NOTE:

Accuracy limitation expected for measurement of Profile Slope and/or Partial Derivative  
Computation expected by insertion of

SHI SHI = 1.0E-03 kg/Kg

AIR SPECIFIC HEAT  
(J/cal/kg K)  
2.414E-02

WATER LAT HEAT VAP  
(J/cal/kg)  
5.9369E-05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905090200  
 START TIME: 7 8:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROHLE TECHNOLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m-2/3)	BAR. PRES. (Millibars)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
11.765	14.09	8.26	NO DATA	1009.86	13.332	-1.566	-1.468	-0.461	-0.303

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m-2/3)
10.00	11.864	12.931	13.029	8.270E-03	79.05	6.725E-03	10.874	13.756	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.017 AT 10M	MOMENTUM FLUX (Nt/m2) -3.81E-01	FRICTION VELOCITY (Meters/sec) 5.565E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.096E-01	AIR DENSITY (Kg/m3) 1.2297
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.09E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.902E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.092E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 7.4145E-02
Z/L AT 10M -0.022	LAT. HEAT FLUX (Watts/m2) 1.51E-02	SCALING POT. TEMP. (Kelvin) -3.779E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.103E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9066E-05
Z/L AT 10 METERS -0.017	SUN. HEAT FLUX (Watts/m2) 2.61E-01	ROUGHNESS LENGTH (Meters) 6.866E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.264
MONTIN-OBUKHOV LENGTH (Meters) -5.957E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.560E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.155E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.91E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.06
	BOWEN RATIO (no units) 0.174			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
70%	70%	60%	133%	51%	10%	102%	184%	30%	104%	21%	50%	60%
164%	1.4%	46%	40%	92%	10%	34%	132%	23%	63%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090210  
 START TIME: 21 8:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROHLE TECHNOLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.002 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -6.84E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 7.217E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.30E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.942E-05 (3.0E-05)
Z/L AT 10M -0.012 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.58E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.692E-02 (2.0E-02)
Z/L AT 10 METERS -0.009 (0.02)	SUN. HEAT FLUX (Watts/m2) 3.69E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.679E-03 (6.0E-05)
MONTIN-OBUKHOV LENGTH (Meters) -1.098E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Dimensionless) 2.589E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.04E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.200 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
36%	29%	51%	11%	23%	0%	13%	16%	26%	16%	1%	64%	50%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905090230  
START TIME: 2:38:50 PST  
END TIME: 3: 9: 0 PST  
START DATE: 9 May 1977 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 2/min  
DATA AVERAGING PERIOD: 30 min  
NUMERICALATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.776	4.854	8.122	7.495	4.592	-0.104	5.221

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. 1. REF. B
1.688	3.777	2.530	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DIP/CAL	DIP/CAL	WIND CH	WIND CH	WIND CH	WIND CH
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.116505	1421.117695	0.199	108	-0.008	-0.050	0.000	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

CHANNEL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0.005V	0.005V	0.002V	0.005V	0.005V	0.005V	0.005V

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	AC FREQ.	AC TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Hz)	(Celsius)
11.651	15.60	8.21	NO DATA	322.5	1008.67	1.40E-01	13.338	264.880	264.880

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)
11.790	13.87	8.31	NO DATA	-0.68	1009.77

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Celsius)
10.35	11.830	12.612	12.991	8.239E-03	79.42	6.765E-03	10.829	13.530	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Celsius)
9.20	11.680	12.959	13.049	8.297E-03	79.20	6.748E-03	10.910	13.770	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090230  
START TIME: 2:38:50 PST  
START DATE: 9 May 1977 (DAY 129)

MARINE SURFACE LAYER  
MFL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 2/min  
DATA AVERAGING PERIOD: 30 min  
NUMERICALATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCL, -WITH HEIGHT)
QUAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.005 AT GMH	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.30E-00	FRICTION VELOCITY (Meters/sec) 1.029E-00	GENERAL FORM: DN/DZ = (N1-N2)/(Ln(Z1/Z2) + (Z1+Z2)/2)	GENERAL FORM: N SLOPE = (Ln(Z1-PSI) - Ln(Z2-PSI))/(N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 8.04E-05	SCALING SPEC. HUMID. (kg/kg) -6.354E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.93E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.89E-01
Z/L AT GMH -0.007	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.99E-02	SCALING POT. TEMP. (Kelvin) -3.920E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.50E-03
Z/L AT 10 METERS -0.005	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 5.01E-01	ROUGHNESS LENGTH (Meters) 3.281E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -5.50E-03	N=POT. TEMP. (kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 1.30E-01
Z/L AT Z1 -0.007	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.46E-01	DRAG COEF. AT 10 METERS (Dimensionless) 4.883E-03		N=LAT. HEAT FLUX (Watts/m <sup>2</sup> ) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.005	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.63E-02			
MONIN-BURKHOFD LENGTH (Meters) -1.942E-03	BOWEN RATIO (no units) 0.252			
PSI1 AT Z1 = 0.033971 PSI1 AT Z2 = 0.017336 PSI2 AT Z1 = 0.008615 PSI2 AT Z2 = 0.010494				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00F -3 kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2293

AIR SPECIFIC HEAT  
(J/cal./kg K)  
2.4145E-02

WATER LAT. HEAT VAP  
(J/cal./kg)  
5.9869E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090230  
 START TIME: 2:38:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 11.773	WIND SPEED (Meter/sec) 14.08	DEW POINT (Celsius) 8.30	TEMP. STRUC. (Kelvin-2/3) NO DATA	BAR. PRES. (Millibar) 1009.67	BULK WT TEMP (Celsius) 13.338	AIR-WT TEMP (Kelvin) -1.565	POT-WT TEMP (Kelvin) -1.467	VIR-WT TEMP (Kelvin) -0.397	V POT-WT TEMP (Kelvin) -0.299
HEIGHT (Meters) 10.00	POT. TEMP. (Celsius) 11.871	VIR. TEMP. (Celsius) 12.941	V. POT. TEMP. (Celsius) 13.019	ABS. HUMID. (Kg/m3) 8.290E-03	REL. HUMID. (Percent) 79.22	SPEC. HUMID. (Kg/Kg) 6.743E-03	VAP. PRES. (Millibars) 10.901	S VAP. PRES. (Millibars) 13.760	REF. INDEX (Kelvin-2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.017 AT GMH	MOMENTUM FLUX (Nt/m2) -3.80E-01	FRICTION VELOCITY (Meters/sec) 5.558E-01	WITH LONG. VELOCITY (Meter2/sec2) -3.089E-01	AIR DENSITY (Kg/m3) 1.2295
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.05E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.656E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.051E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4146E 02
Z/L AT GMH -0.022	LAT. HEAT FLUX (Watts/m2) 1.50E 02	SCALING POT. TEMP. (Kelvin) -3.778E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.100E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9066E 05
Z/L AT 10 METERS -0.017	SIN. HEAT FLUX (Watts/m2) 2.61E 01	ROUGHNESS LENGTH (Meters) 6.840E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.267
MONTIN-OBUKHOV LENGTH (Meters) -5.946E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.559E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.155E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.90E 02			BAR. PRES. AT WT LEVEL (Millibar) 1010.87
	BOWEN RATIO (no units) 0.174			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
64%	64%	54%	130%	47%	10%	99%	177%	27%	103%	20%	47%	54%
164%	164%	46%	40%	92%	10%	34%	132%	23%	63%	115%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090230  
 START TIME: 2:38:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -8.03E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 7.729E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.52E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.90E-05 [3.0E-05]
Z/L AT GMH -0.011 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.61E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.899E-02 [2.0E-02]
Z/L AT 10 METERS -0.008 [0.02]	SIN. HEAT FLUX (Watts/m2) 4.20E 01 [3.0E+06]	ROUGHNESS LENGTH (Meters) 1.92E-03 [6.0E-05]
MONTIN-OBUKHOV LENGTH (Meters) -1.188E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.97E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.05E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.298 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
33%	32%	58%	17%	30%	0%	19%	19%	31%	16%	2%	68%	57%



RUN NUMBER: 7965090300  
 START TIME: 31 9:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V POT-WT TEMP (Kelvin)
11.726	13.76	8.33	NO DATA	1009.76	13.344	-1.618	-1.520	-0.448	0.350

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.924	12.696	12.994	8.310E-03	79.64	6.757E-03	10.926	13.718	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.019 AT 10M	MOMENTUM FLUX (N/m2) -3.56E-01	FRICTION VELOCITY (Meters/sec) 5.398E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.914E-01	AIR DENSITY (Kg/m3) 1.2298
GEOMETRIC MEAN HEIGHT (Meters) 10M (21*22)/2 12.99	HEAT FLUX (KJ/sec m2) 5.69E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.072E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.889E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.414E-02
Z/L AT 10M -0.024	LAT. HEAT FLUX (Watts/m2) 1.46E-02	SCALING POT. TEMP. (Kelvin) -3.936E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.125E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9068E-05
Z/L AT 10 METERS -0.019	SIN. HEAT FLUX (Watts/m2) 2.64E-01	ROUGHNESS LENGTH (Meters) 6.213E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.274
MONIN-OBUKHOF LENGTH (Meters) -5.382E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.538E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.155E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.87E-02			BAR. PRES. AT WT LEVEL (Millibar) 1010.96
	BOWEN RATIO (No units) 0.181			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
61%	61%	52%	122%	45%	10%	98%	174%	26%	103%	19%	46%	52%
173%	163%	46%	40%	91%	10%	34%	131%	23%	63%	114%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7965090300  
 START TIME: 31 9:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.009 (10.0E-02) AT 10M	MOMENTUM FLUX (N/m2) -3.43E-01 (16.0E-02)	FRICTION VELOCITY (Meters/sec) 7.830E-01 (16.0E-02)
GEOMETRIC MEAN HEIGHT (Meters) 10M (21*22)/2 12.99	HEAT FLUX (KJ/sec m2) 6.49E-05 (16.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.914E-05 (13.0E-05)
Z/L AT 10M -0.011 (1.0E-01)	LAT. HEAT FLUX (Watts/m2) 1.60E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.968E-02 (2.0E-02)
Z/L AT 10 METERS -0.009 (1.0E-01)	SIN. HEAT FLUX (Watts/m2) 4.39E-01 (13.0E+01)	ROUGHNESS LENGTH (Meters) 1.268E-03 (16.0E-05)
MONIN-OBUKHOF LENGTH (Meters) -1.15E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.199E-03 (14.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.00E-02 (13.0E+01)	
	BOWEN RATIO (No units) 0.213 (10.0E)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE, (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
192%	32%	61%	21%	31%	6%	22%	18%	33%	16%	1%	71%	60%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905090330  
START TIME: 3:39:30 PST  
END TIME: 4:04:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00 VOLT. REF. A 6.265	No. 01 TEMP. STRUCT. 1 6.060	No. 02 TEMP. STRUCT. 2 6.061	No. 03 DEW POINT 1 4.783	No. 04 DEW POINT 2 4.865	No. 05 WIND SPEED 1 7.615	No. 06 WIND SPEED 2 7.593	No. 07 BAR. PRES. 2 4.597	No. 08 SKY RAD. 0.104	No. 09 WIND DIR. 5.366
No. 10 BULK WT. TEMP. 3.708	No. 11 AC FREQUENCY 3.773	No. 12 AC VOLTAGE 2.531	No. 13 MANUAL FLAG 0.001	No. 14 ZERO REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.265		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS:

No. 1 AIR TEMP. 1 14.11 116101	No. 2 AIR TEMP. 2 14.21 117591	UPWIND NEAR HEIGHT/LENGTH PATH (meters) 0.159	UPWIND LAND HEIGHT/LENGTH PATH (meters) 99	DIPICAL (Volts) 0.000	DIPICAL (Volts) 0.000	WIBICAL (Volts) 0.000	WIBICAL (Volts) 0.000	WIBICAL (Volts) 0.000
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scans) 0	ERROR COUNT (No. scans) 0	DATA RATE (No. scans) 180	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	VOLT. REF. DEV (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC VOLT. FLUX (No. scans) 0	AC VOLT. FLUX (No. scans) 0
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 11.610	WIND SPEED 1 (Meter/sec) 14.63	DEW POINT 1 (Celsius) 8.36	TEMP. STRUCT. 1 (Kelvin-2/3) NO DATA	WIND DIR. (Deg. True) 325.4	BAR. PRES. 1 (Millibar) 1048.75	SKY RAD. (Watts/m <sup>2</sup> ) 1.40E-01	BULK WT. TEMP. (Celsius) 13.357	MEAN AIR TEMP. (Celsius) 13.449
AIR TEMP. 2 (Celsius) 11.750	WIND SPEED 2 (Meter/sec) 13.13	DEW POINT 2 (Celsius) 8.37	TEMP. STRUCT. 2 (Kelvin-2/3) NO DATA	TIDE TABLE (Meter MSL) -0.42	BAR. PRES. 2 (Millibar) 1069.8%			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 11.799	VIR. TEMP. 1 (Celsius) 12.774	V. POT. TEMP. 1 (Celsius) 12.954	ARS. HUMID. 1 (Kg/m <sup>3</sup> ) 8.265E-03	RFL. HUMID. 1 (Percent) 79.86	SPEC. HUMID. 1 (Kg/Kg) 6.724E-03	VAP. PRES. 1 (Millibar) 10.861	S. VAP. PRES. 1 (Millibar) 13.666	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 11.840	VIR. TEMP. 2 (Celsius) 12.924	V. POT. TEMP. 2 (Celsius) 13.014	ARS. HUMID. 2 (Kg/m <sup>3</sup> ) 8.33E-03	RFL. HUMID. 2 (Percent) 79.74	SPEC. HUMID. 2 (Kg/Kg) 6.772E-03	VAP. PRES. 2 (Millibar) 10.957	S. VAP. PRES. 2 (Millibar) 13.741	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905090330  
START TIME: 3:39:30 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.007 AT CMH	MAGNITUDE FLUX (W/m <sup>2</sup> ) -9.90E-01	FRICTION VELOCITY (m/sec) 0.972E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(1+N(Z1/Z2))] * (Z1/Z2) <sup>1/2</sup>	GENERAL FORM: NSLOPE = [(LN(Z1-PSI) - (LN(Z2-PSI))]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) CMH = (Z1+Z2)/2 12.79	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 7.05E-05	SCALING SPEC. HUMID. (Kg/Kg) 6.381E-05	N*WIND SPEED (M/sec) Z*HEIGHT (Meters) DMS/DZ = 1.67E-01	N*WIND SPEED (M/sec) Z*HEIGHT (M) Vert. Axis PSI*PSI1 MS SLOPE = 4.46E-01
Z/L AT CMH -0.009	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.74E-02	SCALING POT. TEMP. (Kelvin) 4.018E-02	N*SPEC. HUMIDITY (Kg/Kg) Z*HEIGHT (Meters) DSH/DZ = -8.92E-06	N*SPEC. HUMIDITY (Kg/Kg) Z*HEIGHT (M) Vert. Axis PSI*PSI2 SH SLOPE = -8.41E-03
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.48E-01	ROUGHNESS LENGTH (Meters) 2.607E-03	N*POT. TEMP. (Kelvin) Z*HEIGHT (Meters) DPT/DZ = -5.61E-03	N*POT. TEMP. (Kelvin) Z*HEIGHT (M) Vert. Axis PSI*PSI2 PTK SLOPE = -1.31E-01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 4.25E-03		N*LAT. HEAT FLUX (W/m <sup>2</sup> ) Z*HEIGHT (M) Vert. Axis PSI*PSI2 CT2 SLOPE = NO DATA
Z/L AT Z2 -0.006	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.34E-02			
MININ-BERKHOF LENGTH (Meters) -1.433E-03				
PSI1 AT Z1 = 0.045378 PSI1 AT Z2 = 3.0235H0 PSI2 AT Z1 = 0.027636 PSI2 AT Z2 = 0.014140	ROBINSON RATIO (No units) 0.257			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION (M/sec <sup>2</sup> ) 9.7959	PRANDTL NUMBER 0.74	PROF. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- 0.01E-03 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> ) 1.2295
AIR SPECIFIC HEAT (J/Kg K) 2.4144E-02
WATER LAT. HEAT VAP (J/Kg K) 5.9071E-02

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090330  
 START TIME: 3:39:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.733	13.31	8.35	NO DATA	1069.75	13.357	-1.624	-1.526	-0.452	-0.354

HEIGHT (Meters)	POT.TEMP. (Celsius)	VIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	AKS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.90	11.831	12.906	13.104	8.325E-03	79.75	6.770E-03	10.946	13.725	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.021 AT 10M	MOMENTUM FLUX (Nt/m2) -3.29E-01	FRICTION VELOCITY (Meters/sec) 5.171E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.674E-01	AIR DENSITY (Kg/m3) 1.2297
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.69E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.944E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.680E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel) 2.414E-02
Z/L AT 10M -0.027	LAT. HEAT FLUX (Watts/m2) 1.41E-02	SCALING POT. TEMP. (Kelvin) -4.002E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.069E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.968E-05
Z/L AT 10 METERS -0.021	SEN. HEAT FLUX (Watts/m2) 2.57E-01	ROUGHNESS LENGTH (Meters) 5.388E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.288
MONTIN-OBUKHOV LENGTH (Meters) -4.859E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.589E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.156E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.81E-02			BAR. PRES. AT WT LEVEL (Millibar) 1810.95
	BOWEN RATIO (no units) 0.183			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-%".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
68%	68%	59%	133%	49%	10%	100%	182%	29%	104%	19%	49%	59%
163%	163%	46%	40%	91%	10%	34%	131%	23%	63%	114%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090330  
 START TIME: 3:39:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARETHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.011 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -6.19E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 6.837E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 6.80E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.974E-05 (3.0E-05)
Z/L AT 10M -0.014 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.48E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -4.016E-02 (2.0E-02)
Z/L AT 10 METERS -0.011 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.81E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.50E-03 (6.0E-05)
MONTIN-OBUKHOV LENGTH (Meters) -9.111E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 2.67E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.94E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.214 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-%".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
38%	37%	54%	13%	26%	0%	15%	18%	28%	16%	0%	69%	5%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 790509461  
START TIME: 4:50 PST  
END TIME: 4:40:15 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL EDGES): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
CORRECTIONS: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* GENERAL OBSERVED RAW DATA (NO CORRECTIONS)

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)
4.274	4.057	4.057	4.274	4.057	4.274	4.057	4.274	4.057
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)
4.274	4.057	4.274	4.057	4.274	4.057	4.274	4.057	4.274

## \* GENERAL OBSERVED RAW DATA (CORRECTIONS) ENCUMBRANCE DATA, FIELD CALIBRATION AND WIND SPEED ENCUMBRANCE CORRECTIONS

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)
4.274	4.057	4.274	4.057	4.274	4.057	4.274	4.057	4.274

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS (ENCUMBRANCE DATA, FIELD CALIBRATION AND WIND SPEED ENCUMBRANCE CORRECTIONS)

NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)
4.274	4.057	4.274	4.057	4.274	4.057	4.274	4.057	4.274

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS (ENCUMBRANCE DATA, FIELD CALIBRATION AND WIND SPEED ENCUMBRANCE CORRECTIONS) TRANSMITTED INTO ENGINEERING UNITS

NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)
4.274	4.057	4.274	4.057	4.274	4.057	4.274	4.057	4.274

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS

NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45
WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)	WIND SPEED (Meters/sec)	WIND DIR. (Deg/True)
4.274	4.057	4.274	4.057	4.274	4.057	4.274	4.057	4.274

## \* CONTINUED BELOW

RUN NUMBER: 790509460  
START TIME: 4:50 PST  
END TIME: 4:40:15 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL EDGES): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
CORRECTIONS: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVE	PROFITE SLOPE (+UP, -DOWN)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GHH	MOMENTUM FLUX (N/m <sup>2</sup> ) -0.28-01	FRICTION VELOCITY (Meters/sec) 0.264E-01	FINAL FORM DZ/DZ (1/N <sup>2</sup> )(1/H)(1/Z) <sup>2</sup> (21420)E-01	GRAD. RICH. A. GHH (1.621E-01)(1.621E-01) (1.621E-01)
GRAD. RICH. MEAN HEIGHT (Meters) GHH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 6.47E-05	SCALING SPEC. HUMID. (kg/kg) 6.412E-05	N-WIND SPEED (Meters/sec) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-WIND SPEED (Meters/sec) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
Z/L AT GHH -0.011	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.60E-02	SCALING POT. TEMP. (Kelvin) 4.036E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
Z/L AT 10 METERS -0.008	SUN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.12E-01	ROUGHNESS LENGTH (Meters) 2.134E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
Z/L AT Z1 -0.011	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 3.93E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 2.16E-02		N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
ROBINSON-GRUBBOW LENGTH (Meters) -1.198E-03	BIMEN RATIO (no units) 0.257		N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) PS1-PS11 MS SLOPE 4.10E-01
PS11 AT Z1= 0.054137 PS11 AT Z2= 0.028034 PS12 AT Z1= 0.033859 PS12 AT Z2= 0.016980				

## \* GENERAL CONSTANTS:

MON KORMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.7779	PROFILE TUR. Schmidt NUMBER 0.74	PROFILE TUR. Schmidt NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by interpolation of:

SHI SLOPE = 2.16E-03 Kq/Kq.

## \* MISCELLANEOUS:

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.225  
AIR SPECIFIC HEAT  
(J/kg K)  
1013  
WATER LAT. HEAT CAP  
(J/kg K)  
4184

## \* CONTINUED ON NEXT PAGE



PIN NUMBER: 7505090400  
 START TIME: 04:25:00 PST  
 START DATE: 09 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel, m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	U. POT-WT TEMP. (Kelvin)
11.747	12.76	8.31	NO DATA	1009.95	13.356	-1.689	-1.511	-0.440	-0.342
W. TEMP. (Celsius)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPED. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel, m-2/3)
11.019	11.945	12.916	13.014	9.101E-03	79.43	6.747E-03	10.915	13.740	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
ERAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034 AT 0M	MOMENTUM FLUX (N/m2) -2.95E-01	FRICTION VELOCITY (Meter/sec) 4.096E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.397E-01	AIR DENSITY (Kg/m3) 1.2299
COUPLING CORREL. HEIGHT (Meter) 1.40E+02/1.22E+02	HUMIDITY FLUX (Kg/sec m2) 5.42E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.125E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.494E-05	AIR SPECIFIC HEAT (J/cal /Kg Kel) 2.414E-02
Z/L AT 0M 0.006	LAT. HEAT FLUX (Watts/m2) 1.36E-02	SCALING POT. TEMP. (Kelvin) -4.032E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.974E-02	WATER LAT. HEAT CAP (J/cal /Kg) 5.986E-01
Z/L AT 10 METERS 1.002	SEN. HEAT FLUX (Watts/m2) 2.45E-01	ROUGHNESS LENGTH (Meter) 4.483E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.290
ROUNDER OBSCUR. LENGTH (Meter) -4.53E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.472E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.156E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.75E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.15
	BOWEN RATIO (no units) 0.181			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROWS ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

ERAD. RICH.	Z/L	MOMENTUM	LAT. HEAT	SEN. HEAT	SKY RAD.	TOTAL HEAT	BOWEN	FRICTION	SCAL. SPEC.	SCAL. POT.	ROUGH.	DRAW
AT 0M	AT 10M	FLUX	FLUX	FLUX	FLUX	FLUX	RATIO	VELOCITY	HUMIDITY	TEMP.	LENGTH	COEF
76%	71%	67%	135%	51%	16%	100%	185%	31%	104%	20%	51%	62%
153%	153%	86%	40%	91%	18%	34%	131%	23%	63%	114%	43%	40%

\* CONTINUED BELOW

PIN NUMBER: 7505090400  
 START TIME: 04:25:00 PST  
 START DATE: 09 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* STANDARD DEVIATION AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERROR. WITHIN THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
ERAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034 (1.0E-01 AT 0M)	MOMENTUM FLUX (N/m2) -5.22E-01 (6.0E-02)	FRICTION VELOCITY (Meter/sec) 6.305E-01 (6.0E-01)
COUPLING CORREL. HEIGHT (Meter) 1.40E+02/1.22E+02	HUMIDITY FLUX (Kg/sec m2) 5.72E-05 (1.0E-04)	SCALING SPEC. HUMID. (Kg/Kg) 9.09E-05 (3.9E-05)
Z/L AT 0M 0.012 (1.0E-01)	LAT. HEAT FLUX (Watts/m2) 1.41E-02 (2.0E+03)	SCALING POT. TEMP. (Kelvin) -4.035E-02 (2.0E-02)
Z/L AT 10 METERS 1.013 (1.0E-01)	SEN. HEAT FLUX (Watts/m2) 3.52E-01 (3.0E+00)	ROUGHNESS LENGTH (Meter) 1.020E-03 (6.0E-05)
ROUNDER OBSCUR. LENGTH (Meter) -4.52E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.45E-01 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meter/s) 2.430E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.09E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.212 (1.00)	

\* STANDARD DEVIATION OF PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED CORRELATION VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

ERAD. RICH.	Z/L	MOMENTUM	LAT. HEAT	SEN. HEAT	SKY RAD.	TOTAL HEAT	BOWEN	FRICTION	SCAL. SPEC.	SCAL. POT.	ROUGH.	DRAW
AT 0M	AT 10M	FLUX	FLUX	FLUX	FLUX	FLUX	RATIO	VELOCITY	HUMIDITY	TEMP.	LENGTH	COEF
40%	40%	50%	10%	20%	0%	12%	18%	27%	17%	0%	69%	3%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905090430  
START TIME: 4:40:10 PST  
END TIME: 5:10:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
DATA AVERAGING PERIOD: 30 Min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE MODE):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR
8.265	8.010	8.011	4.796	4.802	6.977	6.751	4.624	0.053	5.351
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AIR FREQ. 1	AIR FREQ. 2	MANUAL FLAG	TEMP. P11	SPARE A	SPARE B	VOL. REF. B		
6.715	3.273	2.530	0.001	9.001	0.001	9.101	6.235		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DIPICAL	DIPICAL	WIRECAL	WIRECAL	WIRECAL	WIRECAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 116256	1421 117613	0.159	85	9.000	7.951	1.000	0.992	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOL. REF. DIV	VOL. REF. DIV	TEMP. REF. DIV	TEMP. REF. DIV	TEMP. REF. DIV	TEMP. REF. DIV	TEMP. REF. DIV
(No. scans)	(No. scans)	(No. scans)	A (No. 2.0050)	B (No. 2.0050)	C (No. 2.0050)	D (No. 2.0050)	E (No. 2.0050)	F (No. 2.0050)	G (No. 2.0050)
0	0	180	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meters/sec)	(Celsius)	(Kelvin 2/3)	(Degree)	(Millibar)	(Watts/m2)	(Celsius)	(Celsius)
11.624	13.41	8.03	NO DATA	06.3	1009.16	1.16E-01	13.364	204.802
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TIDE F	BAR. PRES. 2			
(Celsius)	(Meters/sec)	(Celsius)	(Kelvin 2/3)	(Meter ASL)	(Millibar)			
11.763	12.11	8.47	NO DATA	-0.16	1010.26			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
10.35	11.003	12.794	12.924	8.109E-03	80.19	6.758E-03	10.921	13.618	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.23	11.82	12.943	13.033	8.1493E-03	80.22	6.821E-03	11.937	13.717	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090430  
START TIME: 4:40:10 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
DATA AVERAGING PERIOD: 30 Min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

PROPERTY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. AT HARDSON NUMBER (+UP, -DOWN) AT GMM 0.009	MOMENTUM FLUX (N/m2) 7.63E-01	FRICTION VELOCITY (Meters/sec) 7.874E-01	GENERAL FORM: DN/DZ = (N1-N2)/(1/N1(Z1/Z2)+ (Z1+Z2)/1/Z1)	GENERAL FORM: N SLOPE = (LN(Z1-P1)-LN(Z2-P1))/( LN1-N2)
MEASURED MEAN HEIGHT (Meters) (LN1+Z1+Z2)/2 12.92	HUMIDITY FLUX (Kg/sec m2) 6.00E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.411E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 1.46E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 5.08E-01
Z/L AT GMM -0.011	LAT. HEAT FLUX (Watts/m2) 1.54E-02	SCALING POT. TEMP. (Kelvin) -3.853E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.47E-03
Z/L AT 10 METERS -0.009	SIN. HEAT FLUX (Watts/m2) 3.77E-01	ROUGHNESS LENGTH (Meters) 1.930E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -5.35E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -1.40E-01
Z/L AT Z1 -0.016	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.16E-01	DRAW COEF. AT 10 METERS (Dimensionless) 3.948E-03		
Z/L AT Z2 -0.008	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.03E-02			
MONTEN-ORIKHOV LENGTH (Meters) -1.146E-03	BOWEN RATIO (no units) 0.245			
PS11 AT Z1 = 0.056025 PS12 AT Z2 = 0.029042 PS12 AT Z1 = 0.034231 PS12 AT Z2 = 0.017596				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec2) 9.7959	PROFILE TUN. PRANDTL NUMBER 0.74	PROFILE TUN. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2299

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- .00E-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4147E-02

WATER LAT. HEAT VAP.  
(J/cal./kg)  
5.9720E-01

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090430  
 START TIME: 4:40:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
11.745	12.26	8.45	NO DATA	1010.16	13.364	-1.619	-1.521	-0.439	0.341

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	11.843	12.925	13.023	8.384E-03	80.22	6.815E-03	11.023	13.741	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDRICH ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+-Stable, -Unstable) -0.027 AT GMH	MOMENTUM FLUX (Nt/m2) -2.66E-01	FRICTION VELOCITY (Meters/sec) 4.653E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.165E-01	AIR DENSITY (Kg/m3) 1.2361
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.16E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.016E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.160E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4142E-02
Z/L AT GMH -0.034	LAT. HEAT FLUX (Watts/m2) 1.28E-02	SCALING POT. TEMP. (Kelvin) -4.119E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.917E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9067E-05
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 2.38E-01	ROUGHNESS LENGTH (Meters) 3.771E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.301
MONIN-OBUKHOV LENGTH (Meters) -3.821E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.16E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.439E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.157E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.63E-02			BAR. PRES. AT WT LEVEL (Millibar) 1011.36
	BOWEN RATIO (no units) 0.187			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
71%	71%	62%	135%	52%	11%	103%	186%	31%	104%	20%	51%	62%
163%	163%	46%	41%	91%	11%	34%	131%	23%	64%	114%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090430  
 START TIME: 4:40:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+-Stable, -Unstable) -0.014 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -4.77E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.022E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.40E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.029E-05 [3.0E-05]
Z/L AT GMH -0.018 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.34E-02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.894E-02 [2.0E-02]
Z/L AT 10 METERS -0.014 [0.02]	SEN. HEAT FLUX (Watts/m2) 3.27E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.086E-03 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -7.121E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.16E-01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.421E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.73E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.211 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
49%	47%	53%	11%	22%	0%	13%	14%	27%	17%	4%	72%	53%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 798090500  
START TIME: 0:16:30 PST  
END TIME: 0:46:48 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2		WIND DIR.
0.000	0.000	0.001	4.797	4.882	7.157	6.679	4.635		388
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
BULK WT. TEMP.	AC. FREQ. NOY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS:

NO. 1	NO. 2	UPWIND NEAR	UPWIND LAND	DPT. CAL	DPT. CAL	WTF. CAL	WS1EC	WS2EC
WIND DIR. 1	WIND DIR. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 116949	1401 117587	0.199	0.0	-0.008	-0.000	0.000	0.992	0.949

## \* ANALOG HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

HOUSEKEEPING	ERROR COUNT	DATA RATE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	A. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(Hz)
0	0	160	0	0	0	0	0	115.3	19.82

## \* DEVELOPED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND DIR. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 2	BAR. PRES. 2	TKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Deg. True)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
1411.05	13.76	8.34	NO DATA	328.2	1009.33	-2.76E-01	13.364	284.827
WIND DIR. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Deg. True)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
1411.05	12.39	8.47	NO DATA	-0.00	1010.42			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	WIND TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.30	11.700	12.776	12.956	8.316E-03	80.34	6.762E-03	10.929	NO DATA
HEIGHT, Z2	POT. TEMP. 2	WIND TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.15	11.819	12.911	13.301	8.350E-03	80.42	6.825E-03	11.042	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 798090500  
START TIME: 0:16:30 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.005 AT 0.0M	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -8.38E-01	FRICTION VELOCITY (Meters/sec) 0.212E-01	GENERAL FORM: DN/DZ = 1/(N1-N2) * 1/(1+Z1/Z2) * (Z1+Z2) * 1/21	GENERAL FORM: N SLOPE = 1/(LnZ1-PSI) - (LnZ2-PSI) / (N1-N2)
10-METER MEAN HEIGHT (Meters) 0.0M = (Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 6.43E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.364E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.54E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 4.87E-01
Z/L AT 0.0M 0.007	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.57E-02	SCALING POT. TEMP. (Kelvin) -2.714E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -8.49E-03
Z/L AT 10 METERS 0.006	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 2.77E-01	ROUGHNESS LENGTH (Meters) 2.141E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -3.80E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -1.99E-01
Z/L AT Z1 0.010	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 2.76E-01	DRAW COEF. AT 10 METERS (Dimensionless) 4.067E-03		N=LnTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.005	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.59E-02			
MIN. DRAG LENGTH (Meters) -1.78E-03	BOWEN RATIO (no units) 0.174			
PSI1 AT Z1 = 0.036026 PSI1 AT Z2 = 0.318879 PSI2 AT Z1 = 0.023368 PSI2 AT Z2 = 0.011401				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = 1/2 \* 0.0E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (Kg/m <sup>3</sup> )	AIR SPECIFIC HEAT (Jcal./Kg Kel.)	WATER LAT. HEAT VAP. (Jcal./Kg)
1.2302	2.4147E-02	5.907E-05

## \* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090500  
 START TIME: 5:10:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kel. xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.714	12.54	8.46	NO DATA	1010.33	13.364	-1.651	-1.553	-0.470	-0.372

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel. xM 2/3)
10.00	11.612	12.895	12.993	8.388E-03	80.41	6.817E-03	11.078	13.715	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.026 AT GMM	MOMENTUM FLUX (Nt/m2) -2.82E-01	FRICTION VELOCITY (Meters/sec) 4.789E-01	WITH LONG. VELOCITY (Meter2/sec2) -2.293E-01	AIR DENSITY (Kg/m3) 1.2305
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.27E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.948E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.27E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4147E 02
Z/L AT GMM -0.032	LAT. HEAT FLUX (Watts/m2) 1.30E 02	SCALING POT. TEMP. (Kelvin) -4.159E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.991E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9669E 05
Z/L AT 10 METERS -0.025	SEN. HEAT FLUX (Watts/m2) 2.48E 01	ROUGHNESS LENGTH (Meters) 4.158E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.303
MONTIN-ORUKHOV LENGTH (Meters) -4.009E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.76E 01	DRAW COEF. AT 10 METERS (Dimensionless) 1.458E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.157E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.28E 02			BAR. PRES. AT WT LEVEL (Millibar) 1011.53
	BOWEN RATIO (no units) 0.190			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-".

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
76%	76%	61%	134%	58%	8%	100%	192%	30%	104%	27%	50%	61%
162%	162%	46%	41%	90%	8%	31%	131%	23%	64%	113%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090500  
 START TIME: 5:10:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.012 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -5.18E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 6.261E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 5.54E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 7.96E-05 [3.0E-05]
Z/L AT GMM -0.015 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.37E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.995E-02 [2.0E-02]
Z/L AT 10 METERS -0.012 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.66E 01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 1.210E-03 [6.0E-05]
MONTIN-ORUKHOV LENGTH (Meters) 8.475E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.76E 01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 2.49E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.33E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.184 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-".

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
54%	51%	53%	12%	6%	0%	13%	4%	28%	17%	28%	72%	53%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905090530  
START TIME: 5:40:50 PST  
END TIME: 6:11:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00 VOLT. REF. A 6.205	No. 01 TEMP. STRUCT. 1 6.000	No. 02 TEMP. STRUCT. 2 6.001	No. 03 DEW POINT 1 4.800	No. 04 DEW POINT 2 4.809	No. 05 WIND SPEED 1 6.619	No. 06 WIND SPEED 2 6.266	No. 07 BAR. PRES. 1 4.657	No. 08 SKY RAD. 0.847	No. 09 WIND DIR. 5.320
No. 10 BULK WT. TEMP. 3.730	No. 11 AIR FREQ. 1 3.732	No. 12 AIR FREQ. 2 3.541	No. 13 ANALOG FLAG 0.001	No. 14 TEMP. REF. 0.001	No. 15 SPARE A 0.001	No. 16 SPARE B 0.001	No. 17 VOLT. REF. B 6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS:

No. 1 AIR TEMP. 1 14.1117997	No. 2 AIR TEMP. 2 14.1117997	DEWPOINT NEAR HEIGHT/LENGTH PATH (meters) 0.159	DEWPOINT FAND HEIGHT/LENGTH PATH (meters) 0.159	DIFFERENTIAL (Volts) 0.008	DIFFERENTIAL (Volts) -0.000	DIFFERENTIAL (Volts) 0.000	DIFFERENTIAL (Volts) 0.000	DIFFERENTIAL (Volts) 0.000	DIFFERENTIAL (Volts) 0.000
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## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG (No. scan) 0	ERROR COUNT (No. scan) 0	DATA DATE (No. scan) 193	VOLT. REF. DEV. (No. scan) 0	VOLT. REF. DEV. (No. scan) 0	ZERO REF. DEV. (No. scan) 0	AC VOLT. REF. DEV. (No. scan) 0	AC FREQ. FLUX (No. scan) 0	AC VOLT. REF. (No. scan) 0	AC FREQ. FLUX (No. scan) 0
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## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1 (Celsius) 11.732	WIND SPEED 1 (Meter/sec) 12.73	DEW POINT 1 (Celsius) 8.39	TEMP. STRUCT. 1 (KELVIN-2/3) NO DATA	WIND DIR. (Deg. True) 53.9	BAR. PRES. 1 (Millibar) 1009.67	SKY RAD. (Watt/m2) 1.11E-02	BULK WT. TEMP. (Celsius) 13.379	AIR TEMP. (Kelvin) 284.926
AIR TEMP. 2 (Celsius) 11.806	WIND SPEED 2 (Meter/sec) 11.61	DEW POINT 2 (Celsius) 8.51	TEMP. STRUCT. 2 (KELVIN-2/3) NO DATA	TIDE TABLE (Meter MSL) 0.10	BAR. PRES. 2 (Millibar) 1010.76			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1 (Meters) 18.35	POT. TEMP. 1 (Celsius) 11.912	WIND TEMP. 1 (Celsius) 12.908	POT. TEMP. 1 (Celsius) 13.088	ABS. HUMID. 1 (Kg/m3) 8.345E-03	REL. HUMID. 1 (Percent) 79.95	SPEC. HUMID. 1 (Kg/Kg) 6.78E-03	VAP. PRES. 1 (Millibar) 10.972	S. VAP. PRES. 1 (Millibar) 13.723	REF. INDEX 1 (Kelvin-2/3) NO DATA
HEIGHT, Z2 (Meters) 9.20	POT. TEMP. 2 (Celsius) 11.850	WIND TEMP. 2 (Celsius) 12.908	POT. TEMP. 2 (Celsius) 13.076	ABS. HUMID. 2 (Kg/m3) 8.422E-03	REL. HUMID. 2 (Percent) 80.26	SPEC. HUMID. 2 (Kg/Kg) 6.844E-03	VAP. PRES. 2 (Millibar) 11.075	S. VAP. PRES. 2 (Millibar) 13.749	REF. INDEX 2 (Kelvin-2/3) NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905090530  
START TIME: 5:40:50 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
MKL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRUGINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
UNAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.006 AT GMM	MOMENTUM FLUX (Nt/m2) -4.79E-01	FRICITION VELOCITY (Meters/sec) 6.243E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1/(N1/Z1)^2 + 1/(N2/Z2)^2)$	GENERAL FORM: $N SLOPE = ((LN Z1 - PSI1) - (LN Z2 - PSI2)) / (N1 - N2)$
GEOMETRIC MEAN HEIGHT (Meter) GMM = $(Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 4.58E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.96E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = 1.25E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 6.41E-01
Z/L AT GMM 0.008	LAT. HEAT FLUX (Watts/m2) 1.13E-02	SCALING POT. TEMP. (Kelvin) 1.673E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -9.06E-03
Z/L AT 10 METERS 0.036	SEN. HEAT FLUX (Watts/m2) -1.30E-01	ROUGHNESS LENGTH (Meters) 9.922E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = 2.56E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 3.23E-01
Z/L AT Z1 0.011	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.18E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.777E-03		N-LNTEMP. STRUCT. (KELVIN-2/3) Z-HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.005	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.77E-01			
MUNIN-BRUKHOV LENGTH (Meters) 1.702E-03				
PSI1 AT Z1 = -0.050659 PSI1 AT Z2 = -0.025399 PSI2 AT Z1 = -0.068459 PSI2 AT Z2 = 0.034323	BOWEN RATIO (no units) -0.115			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUN. PRANDTL NUMBER 0.74	PROFILE TUN. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEF. 0.92E-03	BULK MOISTURE TRANSF. COEF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2302

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4147E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9066E-05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- 0.08E-3 Kg/Kg.

RUN NUMBER: 7905090530  
 START TIME: 5:40:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 1/min  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
11.792	11.74	8.50	NO DATA	1010.67	13.379	-1.588	-1.490	-0.403	6.305

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S-VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	11.690	12.976	13.074	8.413E-03	80.22	6.837E-03	11.063	13.790	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.030 AT 10M	MOMENTUM FLUX (Nt/m2) -2.39E-01	FRICTION VELOCITY (Meters/sec) 4.403E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.938E-01	AIR DENSITY (Kg/m3) 1.27305
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.92E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.086E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.922E-05	AIR SPECIFIC HEAT (Jcal/Kg kel) 2.414E-02
Z/L AT 10M -0.038	LAT. HEAT FLUX (Watts/m2) 1.22E-02	SCALING POT. TEMP. (Kelvin) -4.111E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.810E-02	WATER LAT. HEAT VAP. (Jcal/Kg) 5.9064E-05
Z/L AT 10 METERS -0.029	SEN. HEAT FLUX (Watts/m2) 2.25E-01	ROUGHNESS LENGTH (Meters) 3.120E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.324
MONIN-OBUKHOV LENGTH (Meters) -3.429E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.18E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.405E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.159E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.61E-01			BAR. PRES. AT WT LEVEL (Millibar) 1011.87
	BOWEN RATIO (no units) 0.185			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT UNCERTAINTIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "APR-".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
97%	102%	72%	141%	77%	6%	66%	218%	36%	105%	41%	56%	72%
164%	164%	46%	41%	92%	6%	21%	132%	23%	64%	115%	44%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090530  
 START TIME: 5:40:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT LENGTHS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 (0.02) AT 10M	MOMENTUM FLUX (Nt/m2) -3.33E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 5.122E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.85E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.912E-05 (3.0E-05)
Z/L AT 10M -0.010 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.20E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.497E-03 (2.0E-02)
Z/L AT 10 METERS -0.008 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.20E-01 (3.0E+06)	ROUGHNESS LENGTH (Meters) 6.080E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -1.318E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.18E-02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.897E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.57E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.072 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "APR-".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
93%	90%	37%	4%	557%	0%	83%	194%	18%	20%	166%	56%	50%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 7905060000  
START TIME: 6:11:10 PST  
END TIME: 6:41:20 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND DIR. 1	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	HAR. PRES. 1	SKY RAD.
0.205	0.011	0.001	4.807	4.093	6.508	6.127	4.668	1.587
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	
BULK W. TEMP. 1	REL. HUM. 1	REL. HUM. 2	MANUAL FLAG	ZIRK REF.	SPARE A	SPARE B	VOLT. REF. B	
0.093	0.010	0.553	0.001	0.001	0.001	0.001	6.205	

## \* PROFILE CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 18	No. 19	No. 20	No. 21	No. 22	No. 23	No. 24	No. 25	No. 26	No. 27
WIND TEMP. 1	WIND TEMP. 2	DP/FLAT	DP/FLAT	DP/FLAT	DP/FLAT	DP/FLAT	DP/FLAT	DP/FLAT	DP/FLAT
1.11994	1.0611220	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192

## \* SYSTEM INTERFERENCES PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

CYCLAL FLUX	ERROR COUNT	DATA GATE	VOLT. REF. 1	VOLT. REF. 2	PER. REF. DIV.	AL. VOLT. FLUX	AC. FREQ. FLUX	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.3	59.81

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND DIR. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 2	WIND SPEED 2	HAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Degrees)	(Meters/sec)	(Celsius)	(Kelvin-2/3)	(Degrees)	(Meters/sec)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin)
11.059	10.51	0.40	NO DATA	327.0	1007.83	-2.21E-02	13.392	285.074	
WIND DIR. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TAGE	HAR. PRES. 2				
(Degrees)	(Meters/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)				
11.927	11.37	0.54	NO DATA	0.21	1010.93				

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	WIND TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
0.35	12.177	15.076	13.205	8.344E-03	79.10	6.789E-03	10.977	13.877
HEIGHT, Z2	POT. TEMP. 2	WIND TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	14.019	13.117	13.207	8.43E-04	79.71	6.85E-03	11.055	13.920

\* CONTINUED BELOW

RUN NUMBER: 7905060000  
START TIME: 6:11:10 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUBINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
BRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -4.53E-01	FRICTION VELOCITY (Meters/sec) 0.067E-01	GENERAL FORM: $DH/DZ = 1/(N1-N2) * (1/(Z1/Z2) * (Z1/Z2)^(1/2))$	GENERAL FORM: $N'SLOPE = 1/(N1-N2) * (1/(Z1/Z2) * (Z1/Z2)^(1/2))$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.97	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) -4.14E-05	SCALING SPEC. HUMID. (kg/kg) -5.549E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.20E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 6.59E-01
Z/L AT GMH 0.020	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.07E-02	SCALING POT. TEMP. (Kelvin) 4.126E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = -8.97E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert Axis PS1=PS12 SH SLOPE = 9.74E-03
Z/L AT 10 METERS 0.017	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -3.11E-01	ROUGHNESS LENGTH (Meters) 9.069E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DP1/DZ = 6.63E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert Axis PS1=PS12 PTK SLOPE = 1.31E-01
Z/L AT Z1 0.014	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -7.21E-02	DRAG COEF. AT 10 METERS (Dimensionless) 2.719E-03		N=LNTM. STRUCT. (km-2/3) Z=HEIGHT (M) Vert Axis PS1=NDNL CTP SLOPE=NO DATA
WIND-DRIVEN LENGTH (Meters) 6.706E-02	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -1.50E-02			
PS11 AT Z1 = -0.150115 PS11 AT Z2 = -0.166257 PS12 AT Z1 = -0.178133 PS12 AT Z2 = -0.200519	BRAIN RATIO (no units) -0.304			

## \* GENERAL CONSTANTS:

GRAVITATION PROFILE CONSTANT	GRAVITATION PROFILE NUMBER	PROF. TO SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEF.	BULK MOISTURE TRANSF. COEF.
9.80665	9.80665	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2298

AIR SPECIFIC HEAT  
(J/cal./kg. K)  
2.4147E-02

WATER LAT. HEAT VAP.  
(J/cal./kg.)  
5.4056E-05

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SLOPE = 1.68E-03 kg/kg

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905090606  
 START TIME: 061110 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	Dew POINT (Celsius)	TEMP. STRUC. (Kel xM-2/3)	BAR. PRES. (millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
11.926	11.50	8.52	NO DATA	1010.84	13.392	-1.457	-1.369	-0.280	-0.182
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel xM-2/3)
10.10	12.024	13.112	13.210	8.423E-03	79.63	6.847E-03	11.081	13.913	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.036 AT 10M	MOMENTUM FLUX (Nt/m2) -2.26E-01	FRICITION VELOCITY (Meter/sec) 4.288E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.839E-01	AIR DENSITY (Kg/m3) 1.2301
GEOMETRIC MEAN HEIGHT (Meter) CMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.80E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.144E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.823E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.414E-02
Z/L AT CMH -0.037	LAT. HEAT FLUX (Watts/m2) 1.19E-02	SCALING POT. TEMP. (Kelvin) -3.844E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.648E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9657E-05
Z/L AT 10 METERS 0.029	SUN. HEAT FLUX (Watts/m2) 2.05F 01	ROUGHNESS LENGTH (Meter) 2.85UE-04		VAP. PRES. AT WT LEVEL (Millibar) 15.339
MONTIN-OBUKHOV LENGTH (Meters) -3.48UE-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.21E-02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.389E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.160E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.16E-01			BAR. PRES. AT WT LEVEL (Millibar) 1012.04
	BOWEN RATIO (no units) 0.172			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT CMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF
72%	82%	67%	138%	52%	5%	40%	190%	34%	104%	18%	54%	67%
167%	167%	46%	41%	95%	5%	15%	135%	23%	64%	116%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090606  
 START TIME: 061110 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.001 [0.02] AT CMH	MOMENTUM FLUX (Nt/m2) -3.18E-01 [6.0E-02]	FRICITION VELOCITY (Meter/sec) 5.010E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) CMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.67E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) 7.78E-05 [3.0E-05]
Z/L AT CMH 0.001 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.15E-02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 3.070E-02 [2.0E-02]
Z/L AT 10 METERS 0.001 [0.02]	SUN. HEAT FLUX (Watts/m2) -1.29E-01 [3.0E+01]	ROUGHNESS LENGTH (Meter) 5.617E-04 [6.0E-05]
MONTIN-OBUKHOV LENGTH (Meters) 1.218E-04	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.21E-02 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meter2) 1.389E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.001E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.026 [0.00]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT CMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF
110%	116%	36%	8%	209%	1%	30%	302%	18%	24%	161%	56%	36%

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

RUN NUMBER: 7965090630  
START TIME: 6:41:30 PM  
END TIME: 7:11:40 PM  
START DATE: 4 May 1972 (DAY 109)

PRINT DATE: 11 JUN 1968  
DATA SAMPLING RATE: 0.01 SECONDS  
DATA AVERAGING PERIOD: 30 MIN  
NOMENCLATURE: 1-UPPER CASE, 2-LOWER CASE

No. 00 CUT OFF A 6.265	No. 01 TEMP STRUCT 1 0.001	No. 02 TEMP STRUCT 2 0.001	No. 03 DEW POINT 1 4.793	No. 04 DEW POINT 2 4.875	No. 05 WIND SPEED 1 6.337	No. 06 WIND SPEED 2 5.956	No. 07 PRECIPITATION 4.274	No. 08 REL HUMIDITY 99.999	No. 09 WIND DIRECTION 9.333
No. 10 DUR WT TEMP 5.779	No. 11 AIR FREQUENCY 5.781	No. 12 AIR WGT TEMP 5.785	No. 13 HUMIDITY FLAG 0.001	No. 14 ZERO SET 0.001	No. 15 SOLAR R 0.001	No. 16 SOLAR P 0.003	No. 17 GHI 1000 H 0.005		

[illegible][illegible][illegible]

AIR TEMP. (deg. F)	WIND SPEED (meter/sec)	DW POINT (deg. F)	TEMP. STRO. 2 (KELVIN 25.5)	HT. TRAIL (meter/ft)	RAK. POIN. 2 (meters/ft)
11.500	11.15	8.44	29.054	8.39	11.15

Host, Z1 (detectors)	POT, TEMPL1 (Leistsus)	VIR, TEMPL1 (Leistsus)	V.POT, TEMPL1 (Leistsus)	ABG, HDM1.1 (Kq/m3)	KEL, HDM1.1 (Percent)	SPL, HDM1.1 (Kq/Kq)	CR, HDM1.1 (Leistsus)	1.25, HDM1.1 (Kq/m3)	1.5, HDM1.1 (Kq/m3)	2.0, HDM1.1 (Kq/m3)
HE-HOST, Z1 (detectors)	POT, TEMPL1 (Leistsus)	VIR, TEMPL1 (Leistsus)	V.POT, TEMPL1 (Leistsus)	ABG, HDM1.1 (Kq/m3)	KEL, HDM1.1 (Percent)	SPL, HDM1.1 (Kq/Kq)	CR, HDM1.1 (Leistsus)	1.25, HDM1.1 (Kq/m3)	1.5, HDM1.1 (Kq/m3)	2.0, HDM1.1 (Kq/m3)
HE-HOST, Z2 (detectors)	POT, TEMPL2 (Leistsus)	VIR, TEMPL2 (Leistsus)	V.POT, TEMPL2 (Leistsus)	ABG, HDM1.2 (Kq/m3)	KEL, HDM1.2 (Percent)	SPL, HDM1.2 (Kq/Kq)	CR, HDM1.2 (Leistsus)	1.25, HDM1.2 (Kq/m3)	1.5, HDM1.2 (Kq/m3)	2.0, HDM1.2 (Kq/m3)

RUN NUMBER: 7905190630  
START TIME: 00:41:30 PST  
START DATE: 7 Dec 1979 (DAY 179)

MARINE SURFACE WATER  
NRL MICROME FLUORO. ONLY  
'AN NICOLAS ISLAND, LAI

PRINT DATE: 10-29-1981  
DATA SAMPLING RATE: 1000.0000 Hz  
DATA ACQUISITION PERIOD: 60 MIN  
NUMBER OF CHANNELS: 1008 TOTAL (2 POWER LINE)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SEALING PARAMETERS	PARTIAL DERIVATIVES	FORMULATIONS (CHECKER WITH R-TEXT)
GRADIENT/STANDARD NUMBER (+Stable, -Unstable) 6.622 AT 0MM	MAGNITUDE FLUX (mJ/m2) -2.52E-01	FRICTION VELOCITY (dyn/cm/sec) 4.525E-01	GENERAL LOSS IN DC (mJ/m2) (mJ/m2) (mJ/m2) (21R/21R) (21R/21R)	GENERAL LOSS IN DC (mJ/m2) (mJ/m2) (mJ/m2) (mJ/m2) (mJ/m2) (mJ/m2)
GEOMETRIC MEAN HEIGHT (meter) GMR(21R/21R) 1/2 12.77	HORIZONTAL FLUX (Kq/sec m2) 2.76E-05	SEALING SPEED/HEAD (Kq/Kg) 4.954E-05	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11
Z/L AT 0MM 9.641	LAT-HEAT FLUX (Watts/m2) 4.30E-01	SEALING PUL TEMP (Kq/m3) 4.711E-02	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11
Z/L AT 10 METERS 6.651	SIN-HEAT FLUX (Watts/m2) -2.65E-01	ROUGHNESS LENGTH (meters) 5.429E-04	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11
Z/L AT Z1 9.646	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.33E-02	DRAW FLOW AT 10 METERS (Dimensionless) 1.65E-05	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11	N-WEIGHT FIELD (mJ/m2) 2-HEIGHT (meter) (mJ/m2) DSH-DZ = 1.94E-11
FLUX SMOOTHING LENGTH (mJ/m2) (mJ/m2) 4.15E-02	TOTAL HEAT FLUX/FLUX (Watts/m2) 2.76E-05			
FLUX AT Z1 = 0.0000 FLUX AT Z1 = 0.0000 FLUX AT Z1 = 0.0000 FLUX AT Z1 = 0.0000	RAW N-RATIO (mJ/m2) 0.0000			

200 FORMER COUNTRY	ACQUISITION INFORMATION COUNTRY	PROFIT FOR PERIOD NUMBER	PROFIT FOR SCHMIDT NUMBER	RISK NEW TRADE LOSS	RISK MULTIPLE TRANSFER LOSS
USA	USA	0.74	0.74	6.92E-05	1.32E-03

Atk. Den. 11  
1898

major limitation existed for measurement of Protein Slope and/or Partial beta-value  
 correlation existed by addition of:

041 216.7 0.2 1.24 5.10 0.04

[illegible]

Mathematics Subject Classification. 35P30, 35P35, 35P45, 35P60, 35P65, 35P70, 35P75, 35P80, 35P85, 35P90, 35P95, 35P99, 35Q30, 35Q35, 35Q40, 35Q45, 35Q50, 35Q55, 35Q60, 35Q65, 35Q70, 35Q75, 35Q80, 35Q85, 35Q90, 35Q95, 35Q99, 35R01, 35R05, 35R09, 35R10, 35R11, 35R12, 35R13, 35R14, 35R15, 35R16, 35R17, 35R18, 35R19, 35R20, 35R21, 35R22, 35R23, 35R24, 35R25, 35R26, 35R27, 35R28, 35R29, 35R30, 35R31, 35R32, 35R33, 35R34, 35R35, 35R36, 35R37, 35R38, 35R39, 35R40, 35R41, 35R42, 35R43, 35R44, 35R45, 35R46, 35R47, 35R48, 35R49, 35R50, 35R51, 35R52, 35R53, 35R54, 35R55, 35R56, 35R57, 35R58, 35R59, 35R60, 35R61, 35R62, 35R63, 35R64, 35R65, 35R66, 35R67, 35R68, 35R69, 35R70, 35R71, 35R72, 35R73, 35R74, 35R75, 35R76, 35R77, 35R78, 35R79, 35R80, 35R81, 35R82, 35R83, 35R84, 35R85, 35R86, 35R87, 35R88, 35R89, 35R90, 35R91, 35R92, 35R93, 35R94, 35R95, 35R96, 35R97, 35R98, 35R99, 35S01, 35S05, 35S09, 35S10, 35S11, 35S12, 35S13, 35S14, 35S15, 35S16, 35S17, 35S18, 35S19, 35S20, 35S21, 35S22, 35S23, 35S24, 35S25, 35S26, 35S27, 35S28, 35S29, 35S30, 35S31, 35S32, 35S33, 35S34, 35S35, 35S36, 35S37, 35S38, 35S39, 35S40, 35S41, 35S42, 35S43, 35S44, 35S45, 35S46, 35S47, 35S48, 35S49, 35S50, 35S51, 35S52, 35S53, 35S54, 35S55, 35S56, 35S57, 35S58, 35S59, 35S60, 35S61, 35S62, 35S63, 35S64, 35S65, 35S66, 35S67, 35S68, 35S69, 35S70, 35S71, 35S72, 35S73, 35S74, 35S75, 35S76, 35S77, 35S78, 35S79, 35S80, 35S81, 35S82, 35S83, 35S84, 35S85, 35S86, 35S87, 35S88, 35S89, 35S90, 35S91, 35S92, 35S93, 35S94, 35S95, 35S96, 35S97, 35S98, 35S99, 35T01, 35T05, 35T09, 35T10, 35T11, 35T12, 35T13, 35T14, 35T15, 35T16, 35T17, 35T18, 35T19, 35T20, 35T21, 35T22, 35T23, 35T24, 35T25, 35T26, 35T27, 35T28, 35T29, 35T30, 35T31, 35T32, 35T33, 35T34, 35T35, 35T36, 35T37, 35T38, 35T39, 35T40, 35T41, 35T42, 35T43, 35T44, 35T45, 35T46, 35T47, 35T48, 35T49, 35T50, 35T51, 35T52, 35T53, 35T54, 35T55, 35T56, 35T57, 35T58, 35T59, 35T60, 35T61, 35T62, 35T63, 35T64, 35T65, 35T66, 35T67, 35T68, 35T69, 35T70, 35T71, 35T72, 35T73, 35T74, 35T75, 35T76, 35T77, 35T78, 35T79, 35T80, 35T81, 35T82, 35T83, 35T84, 35T85, 35T86, 35T87, 35T88, 35T89, 35T90, 35T91, 35T92, 35T93, 35T94, 35T95, 35T96, 35T97, 35T98, 35T99, 35U01, 35U05, 35U09, 35U10, 35U11, 35U12, 35U13, 35U14, 35U15, 35U16, 35U17, 35U18, 35U19, 35U20, 35U21, 35U22, 35U23, 35U24, 35U25, 35U26, 35U27, 35U28, 35U29, 35U30, 35U31, 35U32, 35U33, 35U34, 35U35, 35U36, 35U37, 35U38, 35U39, 35U40, 35U41, 35U42, 35U43, 35U44, 35U45, 35U46, 35U47, 35U48, 35U49, 35U50, 35U51, 35U52, 35U53, 35U54, 35U55, 35U56, 35U57, 35U58, 35U59, 35U60, 35U61, 35U62, 35U63, 35U64, 35U65, 35U66, 35U67, 35U68, 35U69, 35U70, 35U71, 35U72, 35U73, 35U74, 35U75, 35U76, 35U77, 35U78, 35U79, 35U80, 35U81, 35U82, 35U83, 35U84, 35U85, 35U86, 35U87, 35U88, 35U89, 35U90, 35U91, 35U92, 35U93, 35U94, 35U95, 35U96, 35U97, 35U98, 35U99, 35V01, 35V05, 35V09, 35V10, 35V11, 35V12, 35V13, 35V14, 35V15, 35V16, 35V17, 35V18, 35V19, 35V20, 35V21, 35V22, 35V23, 35V24, 35V25, 35V26, 35V27, 35V28, 35V29, 35V30, 35V31, 35V32, 35V33, 35V34, 35V35, 35V36, 35V37, 35V38, 35V39, 35V40, 35V41, 35V42, 35V43, 35V44, 35V45, 35V46, 35V47, 35V48, 35V49, 35V50, 35V51, 35V52, 35V53, 35V54, 35V55, 35V56, 35V57, 35V58, 35V59, 35V60, 35V61, 35V62, 35V63, 35V64, 35V65, 35V66, 35V67, 35V68, 35V69, 35V70, 35V71, 35V72, 35V73, 35V74, 35V75, 35V76, 35V77, 35V78, 35V79, 35V80, 35V81, 35V82, 35V83, 35V84, 35V85, 35V86, 35V87, 35V88, 35V89, 35V90, 35V91, 35V92, 35V93, 35V94, 35V95, 35V96, 35V97, 35V98, 35V99, 35W01, 35W05, 35W09, 35W10, 35W11, 35W12, 35W13, 35W14, 35W15, 35W16, 35W17, 35W18, 35W19, 35W20, 35W21, 35W22, 35W23, 35W24, 35W25, 35W26, 35W27, 35W28, 35W29, 35W30, 35W31, 35W32, 35W33, 35W34, 35W35, 35W36, 35W37, 35W38, 35W39, 35W40, 35W41, 35W42, 35W43, 35W44, 35W45, 35W46, 35W47, 35W48, 35W49, 35W50, 35W51, 35W52, 35W53, 35W54, 35W55, 35W56, 35W57, 35W58, 35W59, 35W60, 35W61, 35W62, 35W63, 35W64, 35W65, 35W66, 35W67, 35W68, 35W69, 35W70, 35W71, 35W72, 35W73, 35W74, 35W75, 35W76, 35W77, 35W78, 35W79, 35W80, 35W81, 35W82, 35W83, 35W84, 35W85, 35W86, 35W87, 35W88, 35W89, 35W90, 35W91, 35W92, 35W93, 35W94, 35W95, 35W96, 35W97, 35W98,

RUN NUMBER: 7905090630  
 START TIME: 6:41:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DLW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (millibar)	BULK WT TEMP. (Celsius)	ATR WT TEMP. (Kelvin)	POT WT TEMP. (Kelvin)	VIR WT TEMP. (Kelvin)	V POT WT TEMP. (Kelvin)
11.978	11.17	8.47	NO DATA	1010.90	13.418	-1.446	-1.342	0.262	0.164
HEIGHT (meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (millibars)	S. VAP. PRES. (millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.076	13.157	13.255	8.367E-03	78.89	6.799E-03	11.305	13.965	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.032 AT GNH	MOMENTUM FLUX (Nt/m2) -2.10E-01	FRICTION VELOCITY (meters/sec) 4.132E-01	WITH LONG. VELOCITY (meter2/sec2) -1.707E-01	AIR DENSITY (Kg/m3) 1.2366
GEOMETRIC MEAN HEIGHT (meter) GNH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.80E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.448E-05	WITH ABS. HUMIDITY (meter Kg/sec m3) 4.80E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4147E-02
Z/L AT GNH -0.040	LAT. HEAT FLUX (Watts/m2) 1.19E-02	SCALING POT. TEMP. (Kelvin) -3.824E-02	WITH POT. TEMPERATURE (meter Kel./sec) 1.580E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9654E-05
Z/L AT 10 METERS -0.031	SUN. HEAT FLUX (Watts/m2) 1.96E-01	ROUGHNESS LENGTH (meter) 2.504E-04		VAP. PRES. AT WT LEVEL (millibar) 15.366
MONIN-OBUKHOV LENGTH (Meters) -3.249E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.33E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.367E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.162E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.94E-02			BAR. PRES. AT WT LEVEL (millibar) 1012.10
	BOWEN RATIO (no units) 0.165			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE + or -.

GRAD. RICH. NO. AT GNH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
80%	101%	81%	147%	57%	5%	24%	264%	41%	166%	17%	61%	81%
167%	167%	46%	40%	95%	5%	12%	136%	23%	63%	100%	44%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090630  
 START TIME: 6:41:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.008 (0.02) AT GNH	MOMENTUM FLUX (Nt/m2) -2.25E-01 (6.0E-02)	FRICTION VELOCITY (meters/sec) 4.274E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (meter) GNH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.26E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.769E-05 (3.0E-05)
Z/L AT GNH 0.010 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.08E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 3.661E-02 (2.0E-02)
Z/L AT 10 METERS 0.008 (0.02)	SUN. HEAT FLUX (Watts/m2) 2.18E-06 (3.0E+00)	ROUGHNESS LENGTH (meter) 2.07E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.251E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) 3.33E-02 (2.0E+01)	DRAW COEFF. AT 10 METERS (meter) 1.463E-02 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 2.26E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.056 (0.001)	

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 PROFILE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER APPLICABLE VALUE IS LARGER). ALL VALUES ARE  
 + or -.

	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
	81%	22%	259%	0%	24%	256%	41%	166%	14%	61%	81%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

EXP. NUMBER: 0000000000  
EXP. TITLE: 0000000000  
EXP. TIME: 0000000000  
EXP. DATE: 0000000000 (DAY, 1, 2)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 28 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data \*

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
4.835	4.915	5.076	5.295	4.691	4.375	5.287		
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	
WIND DIR. 10	WIND DIR. 11	WIND DIR. 12	WIND DIR. 13	WIND DIR. 14	WIND DIR. 15	WIND DIR. 16	WIND DIR. 17	
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26
WIND DIR. 18	WIND DIR. 19	WIND DIR. 20	WIND DIR. 21	WIND DIR. 22	WIND DIR. 23	WIND DIR. 24	WIND DIR. 25	WIND DIR. 26
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 27	NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35
WIND DIR. 27	WIND DIR. 28	WIND DIR. 29	WIND DIR. 30	WIND DIR. 31	WIND DIR. 32	WIND DIR. 33	WIND DIR. 34	WIND DIR. 35
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 36	NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44
WIND DIR. 36	WIND DIR. 37	WIND DIR. 38	WIND DIR. 39	WIND DIR. 40	WIND DIR. 41	WIND DIR. 42	WIND DIR. 43	WIND DIR. 44
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 45	NO. 46	NO. 47	NO. 48	NO. 49	NO. 50	NO. 51	NO. 52	NO. 53
WIND DIR. 45	WIND DIR. 46	WIND DIR. 47	WIND DIR. 48	WIND DIR. 49	WIND DIR. 50	WIND DIR. 51	WIND DIR. 52	WIND DIR. 53
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 54	NO. 55	NO. 56	NO. 57	NO. 58	NO. 59	NO. 60	NO. 61	NO. 62
WIND DIR. 54	WIND DIR. 55	WIND DIR. 56	WIND DIR. 57	WIND DIR. 58	WIND DIR. 59	WIND DIR. 60	WIND DIR. 61	WIND DIR. 62
4.835	4.915	5.076	5.295	4.691	4.375	5.287		

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

FLUX PARAMETERS	SPREADING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES
WIND DIR. 54	WIND DIR. 55	WIND DIR. 56	WIND DIR. 57
4.835	4.915	5.076	5.295

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

NO. 63	NO. 64	NO. 65	NO. 66	NO. 67	NO. 68	NO. 69	NO. 70
WIND DIR. 63	WIND DIR. 64	WIND DIR. 65	WIND DIR. 66	WIND DIR. 67	WIND DIR. 68	WIND DIR. 69	WIND DIR. 70
4.835	4.915	5.076	5.295	4.691	4.375	5.287	

\* CHANNELS: CHANNEL 1: Raw Data; CHANNEL 2: Raw Data; CHANNEL 3: Raw Data; CHANNEL 4: Raw Data \*

RUN NUMBER: 7905090800  
 START TIME: 01:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 28 min

#### \* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (KELVIN-M/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V POT-WT TEMP. (Kelvin)
12.007	9.09	8.66	NO DATA	1011.18	13.514	-1.507	1.409	-0.308	-0.210

WIND DIR. (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	AIR HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M/2/3)
10.00	12.105	13.796	13.304	8.504E-03	79.97	6.913E-03	11.192	13.995	NO DATA

#### \* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIFR ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+stable, -unstable) -0.048 AT 10M	MOMENTUM FLUX (Nt/m2) -1.57E-01	FRICTION VELOCITY (Meters/sec) 3.570E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.275E-01	AIR DENSITY (kg/m3) 1.2302
MONOMERIC MEAN HEIGHT (Meter) CHN=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 4.19E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.530E-05	WITH AIR HUMIDITY (Meter Kg/sec m3) 4.185E-05	AIR SPECIFIC HEAT (J/cal. /kg kel) 2.414E-02
Z/L AT 10M -0.058	LAT. HEAT FLUX (Watts/m2) 1.03E-02	SCALING POT. TEMP. (Kelvin) -4.173E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.498E-02	WATER LAT. HEAT VAP (J/cal. /kg) 5.9052E-05
Z/L AT 10 METERS -0.645	SEN. HEAT FLUX (Watts/m2) 1.80E-01	ROUGHNESS LENGTH (Meters) 1.503E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.466
MONIN-OBUKHOV LENGTH (Meters) -2.223E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.10E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.287E-03		AIR HUMID. AT WT LEVEL (kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.88E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.34
	BOWEN RATIO (no units) 0.179			

#### \* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "worst case".

GRAD. RICH. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
81%	97%	76%	144%	59%	5%	15%	203%	38%	106%	21%	58%	76%
16%	16%	46%	41%	93%	5%	8%	134%	73%	64%	116%	43%	40%

#### \* CONTINUE BELOW

RUN NUMBER: 7905090800  
 START TIME: 01:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 28 min

#### \* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARETHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+stable, -unstable) -0.062 (0.01) AT 10M	MOMENTUM FLUX (Nt/m2) -1.90E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.90E-01 (6.0E-02)
MONOMERIC MEAN HEIGHT (Meter) CHN=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 1.98E-05 (4.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.917E-05 (3.0E-05)
Z/L AT 10M -0.095 (0.001)	LAT. HEAT FLUX (Watts/m2) 9.64E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.24E-02 (2.0E-02)
Z/L AT 10 METERS -0.602 (0.001)	SEN. HEAT FLUX (Watts/m2) 4.40E-01 (1.0E+01)	ROUGHNESS LENGTH (Meters) 2.25E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -5.09E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.10E-02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.55E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.11E-02 (5.0E+01)	
	BOWEN RATIO (no units) 0.067 (0.001)	

#### \* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR A MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ARBITRARY VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "worst case".

GRAD. RICH. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
10%	17%	24%	19%	43%	0%	7%	204%	17%	24%	205%	46%	40%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905090830  
START TIME: 8:30: 0 PST  
END TIME: 9: 0:10 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
5.285	0.061	0.061	4.826	4.903	5.349	5.169	4.706	4.986	5.167
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.905	3.750	2.545	0.001	0.001	0.001	0.001	0.295		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1/FCL	DP2/FCL	WTEFCN	WTEFC	WTEFC
ATR TEMP. 1	ATR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121134	1421 121593	0.183	87	-0.008	-0.053	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA GAGE	VOL. REF. DEV	VOL. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No. 0.005V)	B(No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.75

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

ATR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
17.113	17.30	8.51	NO DATA	318.6	1010.43	-6.95E 02	13.349	265.296
ATR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter MSL)	(Millibar)			
12.159	9.65	8.60	NO DATA	0.33	1011.50			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AHS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
18.35	12.293	13.306	13.480	8.407E-03	78.59	6.841E-03	11.068	14.083	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AHS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	12.249	13.353	13.443	8.465E-03	78.62	6.862E-03	11.146	14.141	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905090830  
START TIME: 8:30: 0 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.032 AT 6MH	MOMENTUM FLUX (Nt/m2) -1.13E-01	FRICTION VELOCITY (m/sec) 0.029E-01	GENERAL FORM: $DN/DZ = [(N1-N2)]/[(1/N1)(Z1/Z2)]$	GENERAL FORM: $W/SLOPE = [(1/N1)(Z1/Z2)] - [(1/N2)(Z1/Z2)]$
ISOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.97	HUMIDITY FLUX (Kg/sec m2) 1.76E-05	SCALING SPEC. HUMID. (Kg/Kg) -4.730E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 7.23E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.32E 00
Z/L AT 6MH 0.050	LAT. HEAT FLUX (Watts/m2) 4.35E 01	SCALING POT. TEMP. (Kelvin) 2.592E-02	N=SPEC. HUMIDITY (kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -1.14E 04
Z/L AT 10 METERS 0.039	SIN. HEAT FLUX (Watts/m2) -9.76E 00	ROUGHNESS LENGTH (Meters) 8.322E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 4.89E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 2.09E 01
Z/L AT Z1 0.071	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.95E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.035E-05		N=LATENT HEAT FLUX (Kcal/m2/3) Z=HEIGHT (M) Vert. Axis PSI=NDON CT2 SLOPE=NO DATA
Z/L AT Z2 0.035	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.61E 02			
MININ-OBUKHOV LENGTH (Meters) 2.96E 02	BROWN RATIO (no units) -0.224			
PSI1 AT Z1 = -0.332271 PSI1 AT Z2 = -0.164588 PSI2 AT Z1 = -0.449015 PSI2 AT Z2 = 0.225119				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2295

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SH1 SH2 +/- 0.01-3 Kg/Kg.

AIR SPECIFIC HEAT  
(J/Kcal/Kg)  
2.414E 02

WATER LAT. HEAT VAP  
(J/Kcal/Kg)  
5.9045E 05

RUN NUMBER: 7905090830  
 START TIME: 8:30: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: ALL CHANNELS 60/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP-STUC. (Kelvin-2/3)	BAR PRESS. (millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT WT TEMP (Kelvin)	VIR WT TEMP (Kelvin)	V POT WT TEMP (Kelvin)
12.154	9.73	8.59	NO DATA	1011.41	15.549	-1.596	-1.298	-6.203	-6.105
HEIGHT (Meters)	POT TEMP. (Celsius)	VIR TEMP. (Celsius)	V POT TEMP. (Celsius)	ARS HUMID. (Kq/m3)	REL HUMID. (Percent)	SPEC HUMID. (Kq/Kq)	VAP PRES. (millibars)	S VAP PRES (millibars)	REF INDEX (Kelvin-2/3)
10.00	12.252	13.347	13.445	8.458E-03	78.79	6.377E-03	11.147	14.134	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (*UP, *-DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (*Stable, -Unstable) -0.048 AT GMH	MOMENTUM FLUX (Nt/m2) -1.48E-01	FRICTION VELOCITY (meter/sec) 3.468E-01	WITH LONG. VELOCITY (meter2/sec2) -1.263E-01	AIR DENSITY (Kq/m3) 1.2298
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kq/sec m2) 4.17E-05	SCALING SPEC HUMID. (Kq/Kq) -9.813E-05	WITH ABS. HUMIDITY (Meter Kq/sec m3) 4.186E-05	AIR SPECIFIC HEAT (ITcal./Kq Kel.) 2.4149E-02
Z/L AT GMH -0.059	LAT. HEAT FLUX (Watts/m2) 1.03E-02	SCALING POT. TEMP. (Kelvin) -3.924E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.361E-02	WATER LAT. HEAT VAP (ITcal./Kq Kel.) 5.9644E-05
Z/L AT 10 METERS -0.045	SEN. HEAT FLUX (Watts/m2) 1.69E-01	ROUGHNESS LENGTH (Meters) 1.356E-04		VAP. PRES. AT WT LEVEL (millibar) 15.506
MONIN-OBUKHOV LENGTH (Meters) -2.232E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.95E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.272E-03		ABS. HUMID. AT WT LEVEL (Kq/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.74E-02			BAR PRES. AT WT LEVEL (millibar) 1012.61
	BOWEN RATIO (no units) 0.164			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE \*per\*.

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
104%	138%	103%	160%	79%	5%	11%	239%	50%	169%	27%	72%	163%
169%	169%	46%	40%	97%	5%	7%	137%	23%	63%	100%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090830  
 START TIME: 8:30: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: ALL CHANNELS 60/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARETHESIS:

STABILITY	FLUX PARAMETERS (*UP, *-DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (*Stable, -Unstable) 0.001 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -1.37E-01 (6.0E-02)	FRICTION VELOCITY (meter/sec) 3.333E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kq/sec m2) 3.70E-05 (8.0E-04)	SCALING SPEC HUMID. (Kq/Kq) 7.94E-05 (3.0E-05)
Z/L AT GMH 0.001 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.14E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.396E-02 (2.0E-02)
Z/L AT 10 METERS 0.001 (0.02)	SEN. HEAT FLUX (Watts/m2) 2.21E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.160E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 9.572E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.95E-02 (2.0E+01)	DRAW COEF. AT 10 METERS (meter) 1.272E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.07E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.022 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE \*per\*:

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
205%	209%	14%	38%	447%	0%	7%	251%	7%	33%	193%	23%	11%

## MARINE SURFACE LAYER ATMOSPHERIC FLUXES USUAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

A \* \* \* MICROFLUX USUAL DATA \* \* \* A

RAW DATA: 2015090908  
DATE TIME: 11 JUN 1980  
TIME: 08:00 PST  
FILE: 001 11 JUN 1980 (122)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.2/min  
DATA AVERAGING PERIOD: 30 min  
NUMERATURES: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* MICROFLUX USUAL DATA (CHECKED, V003):

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003):

FOR WIND DIR DATA, EFFECT OF OBSERVATION ON WIND SPEED ESTIMATION CORRECTIONS:

NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

WIND DIR DATA, EFFECT OF OBSERVATION ON WIND SPEED ESTIMATION CORRECTIONS:

NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 46	NO. 47	NO. 48	NO. 49	NO. 50	NO. 51	NO. 52	NO. 53	NO. 54
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 55	NO. 56	NO. 57	NO. 58	NO. 59	NO. 60	NO. 61	NO. 62	NO. 63
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 64	NO. 65	NO. 66	NO. 67	NO. 68	NO. 69	NO. 70	NO. 71	NO. 72
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 73	NO. 74	NO. 75	NO. 76	NO. 77	NO. 78	NO. 79	NO. 80	NO. 81
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 82	NO. 83	NO. 84	NO. 85	NO. 86	NO. 87	NO. 88	NO. 89	NO. 90
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 91	NO. 92	NO. 93	NO. 94	NO. 95	NO. 96	NO. 97	NO. 98	NO. 99
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS

NO. 100	NO. 101	NO. 102	NO. 103	NO. 104	NO. 105	NO. 106	NO. 107	NO. 108
WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR	WIND SPD	WIND DIR
4.020	4.505	4.020	4.505	4.020	4.505	4.020	4.505	4.020

## \* MICROFLUX USUAL DATA (CHECKED, V003): CORRECTIONS TO WIND DIR DATA (CHECKED, V003) TRANSLATED INTO ENGINEERING UNITS



RUN NUMBER: 000509000  
 START TIME: 9: 0:20 PM  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	U-POT-WT TEMP (Kelvin)
12.192	10.21	8.58	NO DATA	1011.49	13.599	-1.407	-1.309	-0.214	-0.116

REL HUMID. (Percent)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	U-POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel xM-2/3)
13.93	12.290	13.385	13.403	8.457E-03	78.59	6.877E-03	11.137	14.171	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (-Stable, + Unstable) 0.041 At GNH	MOMENTUM FLUX (Nt/m2) -1.67E-01	FRICTION VELOCITY (Meters/sec) 3.687E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.360E-01	AIR DENSITY (Kg/m3) 1.2298
GEOMETRIC MEAN HEIGHT (Meters) GNM (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.45E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.805E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.446E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.4149E-02
Z/L AT GNH 0.091	LAT. HEAT FLUX (Watts/m2) 1.10E-02	SCALING POT. TEMP. (Kelvin) -3.876E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.429E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.9042E-05
Z/L AT 10 METERS 0.039	SEN. HEAT FLUX (Watts/m2) 1.78E-01	ROUGHNESS LENGTH (Meters) 1.684E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.557
MOUNTAIN ROUGHNESS LENGTH (Meters) 1.7504E-04	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.79E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.304E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.51E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.69
	BOWEN RATIO (no. units) 0.162			

\* COMPONENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE FROM THE FROM VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH.	Z/L	MOM. FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
10%	14%	10%	16%	7%	5%	9%	24%	5%	10%	25%	7%	10%
10%	14%	4%	40%	96%	3%	7%	13%	23%	63%	11%	43%	40%

\* END OF RECORD

RUN NUMBER: 000509000  
 START TIME: 9: 0:20 PM  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* DERIVED FROM THE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (-Stable, + Unstable) 0.041 (+0.01, -0.01) At GNH	MOMENTUM FLUX (Nt/m2) -1.49E-01 (+6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.462E-01 (+6.0E-02)
GEOMETRIC MEAN HEIGHT (Meters) GNM (Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.80E-05 (+3.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.86E-05 (+3.0E-05)
Z/L AT GNH 0.091 (+0.01)	LAT. HEAT FLUX (Watts/m2) 9.62E-01 (+2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.759E-02 (+2.0E-02)
Z/L AT 10 METERS 0.037 (+0.01)	SEN. HEAT FLUX (Watts/m2) 2.16E-01 (+3.0E+01)	ROUGHNESS LENGTH (Meters) 1.337E-04 (+6.0E-05)
MOUNTAIN ROUGHNESS LENGTH (Meters) 1.402E-04	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.79E-02 (+2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.189E-03 (+4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.94E-02 (+3.0E+01)	
	BOWEN RATIO (no. units) 0.038 (+0.01)	

\* DERIVED FROM THE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE DERIVED PARAMETER VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH.	Z/L	MOM. FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
10%	14%	10%	4%	47%	0%	7%	27%	12%	35%	21%	37%	20%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905090730  
START TIME: 9:30:40 PST  
END TIME: 10:05:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
ALTITUDE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* AIRCRAFT CHANNEL RAW DATA (AVERAGE VALUES)

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. T. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	BAR. PRES. 2	REL. HUM. 1
6.205	0.001	0.001	4.815	4.984	0.147	0.065	4.712	6.151	4.960
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. T. REF. B		
5.976	5.881	7.548	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGED) ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

No. 1	No. 2	DOWNWIND NEAR	UPWIND TAND	DIFF. WIND	DIFF. PRES.	DIFF. TEMP.	DIFF. HUM.	DIFF. WIND	DIFF. PRES.	DIFF. TEMP.	DIFF. HUM.
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
1411.121563	1401.121003	0.1133	98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS

MANUAL FLAG	ERROR COUNT	DATA PAI	VOL. T. REF. A	VOL. T. REF. B	ZERO REF.	AC. VOLTAGE	AC. FREQUENCY	AC. VOLTAGE	AC. FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	115.4	115.4	115.4	115.4

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	BAR. PRES. 1	REL. HUM. 1	BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE
(Celsius)	(meters/sec)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
12.158	11.01	9.44	NO DATA	213.7	1013.09	8.55E-02	13.819	115.4	115.4
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR. 2	BAR. PRES. 2	REL. HUM. 2	BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE
(Celsius)	(meters/sec)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
12.200	10.97	8.50	NO DATA	0.17	1011.60	1011.60			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(percent)	(kg/kg)	(millibar)	(millibar)	(Celsius)
18.35	12.331	13.340	13.329	8.549E-03	78.61	6.884E-03	11.619	14.126	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(percent)	(kg/kg)	(millibar)	(millibar)	(Celsius)
9.10	12.193	13.194	13.185	8.467E-03	78.63	6.884E-03	11.619	14.103	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905090730  
START TIME: 9:30:40 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
RAW MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
ALTITUDE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCH WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.018 AT GMM	MOMENTUM FLUX (m <sup>2</sup> /s <sup>2</sup> ) -0.50E-01	FRICTION VELOCITY (meters/sec) 4.584E-01	GENERAL FORM DN/DZ 1/(N1-N2)1/2 (N1+Z2)1/2	GENERAL FORM N SLOPE 1/(LnZ1-PS1)-(LnZ2-PS1)1/2 (N1-N2)
GEOMETRIC MEAN HEIGHT (meter) GMM=(Z1+Z2)/2 10.97	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 3.09E-05	SCALING SPEC. HUMID. (kg/kg) 5.351E-02	N WIND SPEED (m/sec) Z-HEIGHT (meters) DWS/DZ = 9.94E-02	N WIND SPEED (m/sec) Z-HEIGHT (m) Vert. Axis PS1-PS12 WS SLOPE = 8.73E-01
Z/L AT GMM 0.027	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 7.43E-01	SCALING POT. TEMP. (Kelvin) 3.198E-02	N SPEC. HUMIDITY (kg/kg) Z-HEIGHT (meters) DSH/DZ = -8.92E-06	N SPEC. HUMIDITY (kg/kg) Z-HEIGHT (m) Vert. Axis PS1-PS12 SH SLOPE = -1.01E-04
Z/L AT 10 METERS 0.021	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -1.02E-01	ROUGHNESS LENGTH (meters) 3.584E-04	N POT. TEMP. (Kelvin) Z-HEIGHT (meters) DPT/DZ = 5.35E-03	N POT. TEMP. (Kelvin) Z-HEIGHT (m) Vert. Axis PS1-PS12 PTK SLOPE = -1.69E-01
Z/L AT Z2 0.019	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 8.55E-02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.75E-03		
DOWNWIND DRAG LENGTH (meters) 4.114E-02	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -7.99E-02			N-TEMP. STRUCT. (km 2/3) Z-HEIGHT (m) Vert. Axis PS1=NONE LTP SLOPE=NO DATA
PS11 AT Z1 = -0.179154 PS11 AT Z2 = -0.089901 PS12 AT Z1 = -0.742100 PS12 AT Z2 = -0.121360	BOWEN RATIO (no units) -0.245			

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No. units)	GRAVITATION ACCELERATION (m/sec <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	RH K SEN. HEAT TRANSFER COEFF.	BULK MOISTURE TRANSFER COEFF.
0.4	9.7979	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivatives.  
Computation executed by insertion of:

SHI DSH = 4.7 0.00E-03 kg/kg

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2294

AIR SPECIFIC HEAT  
(J/kg K)  
2.4140E-02

WATER LAT. HEAT CAP.  
(J/kg K)  
5.9043E-01

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905090930  
 START TIME: 9:40:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.195	11.03	8.58	NO DATA	1011.51	13.619	-1.424	-1.326	-0.231	-0.133

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xm-2/3)
10.09	12.293	13.388	13.486	8.455E-03	78.56	6.875E-03	11.135	14.174	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.033 AT GHH	MOMENTUM FLUX (Nt/m2) -2.03E-01	FRICTION VELOCITY (Meters/sec) 4.063E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.651E-01	AIR DENSITY (Kg/m3) 1.2298
GEOMETRIC MEAN HEIGHT (Meter) GHH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.07E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.655E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.925E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4149E 02
Z/L AT GHH -0.041	LAT. HEAT FLUX (Watts/m2) 1.19E 02	SCALING POT. TEMP. (Kelvin) -3.802E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.545E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9042E 05
Z/L AT 10 METERS 0.032	SEN. HEAT FLUX (Watts/m2) 1.92E 01	ROUGHNESS LENGTH (Meters) 2.365E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.577
MUNIN-OBUKHOV LENGTH (Meters) -3.162E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -8.55E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.356E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.177E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.16E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.71
	BOWEN RATIO (no units) 0.161			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
88%	104%	83%	147%	64%	5%	12%	212%	42%	166%	23%	62%	83%
168%	168%	46%	40%	96%	5%	7%	136%	23%	63%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905090930  
 START TIME: 9:30:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.001 (0.02) AT GHH	MOMENTUM FLUX (Nt/m2) -2.23E-01 (1.6E-02)	FRICTION VELOCITY (Meters/sec) 4.249E-01 (1.6E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.44E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 9.941E-05 (3.0E-05)
Z/L AT GHH 0.001 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.10E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.080E-02 (2.0E-02)
Z/L AT 10 METERS 0.001 (0.02)	SEN. HEAT FLUX (Watts/m2) -3.21E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.056E-04 (1.0E-05)
MUNIN-OBUKHOV LENGTH (Meters) 1.412E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) -0.55E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.408E-03 (1.4E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.45E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.062 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
135%	135%	13%	24%	594%	0%	6%	260%	6%	20%	214%	22%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* METEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 775091000  
START TIME: 10:11:00 PST  
END TIME: 10:31:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VALUE):

NO.01 VOLT REF. A	NO.01 TEMP. STRUCT. 1	NO.02 TEMP. STRUCT. 2	NO.03 DN POINT 1	NO.04 DN POINT 2	NO.05 WIND SPEED 1	NO.06 WIND SPEED 2	NO.07 BAR. PRES. 2	NO.08 SKY RAD.	NO.09 WIND DIR.
6.205	6.001	6.661	4.844	4.924	5.765	5.563	4.726	6.533	4.983
NO.10 BULK WT TEMP	NO.11 AC FREQUENCY	NO.12 AC VOLTAGE	NO.13 HUMID. FLAG	NO.14 ZIRU KEL.	NO.15 SPARE A	NO.16 SPARE B	NO.17 VOLT. REF. B		
4.195	3.694	2.540	0.001	0.001	0.001	0.001	6.205		

## \* ANALOG CHANNEL RAW DATA (AVERAGE VALUE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

NO.18 WIND FLAP 1	NO.19 WIND FLAP 2	UPWIND N/O	UPWIND LND	DP1 CAL	DP2 CAL	WT1 CAL	WT2 CAL	WS1 EC	WS2 EC
1401.00007	1401.00007	0.103	1.6	0.008	0.000	0.000	0.000	0.992	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS (TRANSLATED INTO ENGINEERING UNITS):

NO.20 VOLT. REF. A	NO.21 BOOK COUNT	DATA PAGE	VOLT. REF. DIV	VOLT. REF. DIV	ZIRU REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
6.205	1	100	100.0000V	100.0000V	100.0000V	(No. 1) 5V	(No. 1) Hz	115.4	59.88

## \* ANALOG CHANNEL TRANSLATED DATA (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

WIND FLAP 1	WIND SPEED 1	DN POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
1401.00007	11.09	4.844	NO DATA	314.4	1010.71	-9.11E 02	13.647	265.378
WIND FLAP 2	WIND SPEED 2	DN POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
1401.00007	11.37	4.924	NO DATA	0.05	1011.81			

## \* CHANNEL TRANSLATED DATA (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

NO.22 REL. HUMID. 1	NO.23 REL. HUMID. 2	NO.24 SPEC. HUMID. 1	NO.25 SPEC. HUMID. 2	NO.26 VAP. PRES. 1	NO.27 VAP. PRES. 2	NO.28 S.VAP. PRES. 1	NO.29 S.VAP. PRES. 2	NO.30 REF. INDEX 1	NO.31 REF. INDEX 2
18.35	18.35	6.892E-03	6.892E-03	11.152	11.245	14.161	14.223	NO DATA	NO DATA
NO.32 REL. HUMID. 1	NO.33 REL. HUMID. 2	NO.34 SPEC. HUMID. 1	NO.35 SPEC. HUMID. 2	NO.36 VAP. PRES. 1	NO.37 VAP. PRES. 2	NO.38 S.VAP. PRES. 1	NO.39 S.VAP. PRES. 2	NO.40 REF. INDEX 1	NO.41 REF. INDEX 2
18.35	18.35	6.892E-03	6.892E-03	11.152	11.245	14.161	14.223	NO DATA	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 995091000  
START TIME: 10:11:00 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
BRAD. RICHARDSON NUMBER (=Stable, -Unstable) 0.024	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.50E-01	FRICTION VELOCITY (Meters/sec) 3.594E-01	GENERAL FORM: DN/DZ = [(N1-N2)/1 + (Z1/Z2)* (Z1*Z2)/1/2]	GENERAL FORM: 'N' SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GDM=(Z1+Z2)/2 12.99	HEAT FLUX (Kq/sec m <sup>2</sup> ) 2.29E-05	SCALING SPEC. HUMID. (Kq/m <sup>3</sup> ) -5.09E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 8.06E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.12E 00
Z/L AT GDM 0.035	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 5.50E 01	SCALING POT. TEMP. (Kelvin) 2.563E-02	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -1.04E 04
Z/L AT 10 METERS 0.029	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -1.14E 01	ROUGHNESS LENGTH (Meters) 1.573E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 4.49E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 2.11E 01
Z/L AT Z1 0.009	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) -9.11E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.23E 05	N=Ln TEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONI CT2 SLOPE=NO DATA	
Z/L AT Z2 0.025	INITIAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -8.67E 02			
MINI-ROUGHNESS LENGTH (Meters) 3.674E 02	BOWEN RATIO (no units) -0.206			
PSI1 AT Z1 = 0.034745 PSI1 AT Z2 = 0.117622 PSI2 AT Z1 = 0.317222 PSI2 AT Z2 = 0.159943				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units) 0.4	GRAVITATION ACCELERATION (m/sec <sup>2</sup> ) 9.7979	PROFILE TUM. PRANDTL NUMBER 0.74	PROFILE TUM. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
---	--	---	---	---	--

## \* MISCELLANEOUS

AIR DENSITY  
(Kq/m<sup>3</sup>)  
1.2295  
  
AIR SPECIFIC HEAT  
(J/cal./Kq Kel.)  
2.4149E 02  
  
WATER LAT. HEAT VAP.  
(J/cal./Kq)  
5.9040E 05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of 0:

SHI SH2 = 47.168E-3 Kq/Kg.

RUN NUMBER: 7905091000  
 START TIME: 10:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.237	10.46	8.71	NO DATA	1011.71	13.647	-1.411	-1.313	-0.207	-0.109
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.335	13.440	13.538	8.530E-03	79.03	6.936E-03	11.235	14.216	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.039 AT 10M	MOMENTUM FLUX (N/m2) -1.77E-01	FRICTION VELOCITY (Meters/sec) 3.799E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.443E-01	AIR DENSITY (Kg/m3) 1.2298
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.50E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.641E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.504E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4150E 02
Z/L AT GMH -0.348	LAT. HEAT FLUX (Watts/m2) 1.11E 02	SCALING POT. TEMP. (Kelvin) -3.851E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.453E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
Z/L AT 10 METERS -0.037	SEN. HEAT FLUX (Watts/m2) 1.82E 01	ROUGHNESS LENGTH (Meters) 1.870E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.610
MONIN-OBUKHOV LENGTH (Meters) -0.729E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.11E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.320E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.179E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.82E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.91
	BOWEN RATIO (no units) 0.163			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
103%	127%	98%	156%	76%	5%	10%	233%	49%	107%	27%	69%	98%
168%	164%	46%	40%	96%	5%	6%	136%	23%	63%	119%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091000  
 START TIME: 10:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.060 (0.02) AT GMH	MOMENTUM FLUX (N/m2) -1.71E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.738E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.04E-05 (8.9E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.557E-05 (3.0E-05)
Z/L AT GMH -0.343 (0.02)	LAT. HEAT FLUX (Watts/m2) 9.99E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 1.364E-02 (2.0E-02)
Z/L AT 10 METERS -0.060 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.69E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.737E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -3.471E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.11E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.294E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.15E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.027 (6.0E-01)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
164%	161%	6%	3%	492%	0%	5%	248%	3%	70%	189%	10%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905091030  
START TIME: 10:31:20 PST  
END TIME: 11:13:30 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 01	WIND SPEED 02	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.877	4.961	6.081	5.841	4.729	6.802	4.942
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.019	3.914	2.540	0.001	0.001	0.001	0.001	5.235		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DPT/CAL	DPT/CAL	WIND/CAL	WIND/CAL	WIND/CAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 122122	1421 122792	0.183	115	-0.008	-0.050	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERRR COUNT	DATA BASE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. .005V)	B (No. .005V)	(No. .005V)	(No. .05V)	(No. .1Hz)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.97

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.212	11.70	8.81	NO DATA	313.2	1019.77	-9.51E-02	13.68	285.416
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-273)	(Meter RSL)	(Millibar)			
12.279	10.84	8.95	NO DATA	-0.07	1011.67			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
18.35	12.392	13.424	13.604	8.583E-03	79.71	6.985E-03	11.363	14.106	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-273)
9.20	12.369	13.502	13.593	8.667E-03	80.08	7.045E-03	11.417	14.018	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905091030  
START TIME: 10:31:20 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NUMERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BISINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (1=Stable, -Unstable) 0.009 AT GMM	MOMENTUM FLUX (N/m2) -2.66E-01	FRICTION VELOCITY (Meters/sec) 4.652E-01	GENERAL FORM: $DN/DZ = 1/(N1-N2) * 1/(1+(Z1/Z2)^2)$	GENERAL FORM: $N SLOPE = 1/(LnZ1-PS1) - (LnZ2-PS1) / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.764E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) $DSH/DZ = 9.52E-02$	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis $PS1=PS11$ $WS SLOPE = 8.60E-01$
Z/L AT GMM 0.013	LAT. HEAT FLUX (Watts/m2) 8.15E 01	SCALING POT. TEMP. (Kelvin) 1.630E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis $PS1=PS12$ $SH SLOPE = -9.21E 03$
Z/L AT Z1 0.017	GEN. HEAT FLUX (Watts/m2) -9.43E 00	ROUGHNESS LENGTH (Meters) 3.770E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) $DPT/DZ = 2.52E-03$	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis $PS1=PS10$ $PTK SLOPE = 3.32E 01$
Z/L AT Z2 0.009	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.51E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.850E-03		
MONIN-OBUKHOV LENGTH (Meters) 9.727E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.79E 02			
PS11 AT Z1 = -0.088666 PS11 AT Z2 = -0.044494 PS12 AT Z1 = -0.119819 PS12 AT Z2 = -0.360073	ROUEN RATIO (no units) -0.116			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHEMIDT NUMBER	BULK SEN HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2293

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

$SH1-SH2 = +/- .08E-3$  Kg/Kg.

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.43E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9039E 05

RUN NUMBER: ZY050V1036  
 START TIME: 10:31:20 PST  
 START DATE: 7 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED WINDMILL METEOROLOGICAL PARAMETERS AT TEN METERS:

WIND DIR.	WIND SPEED	DEW POINT	TEMP. SURF.	BAR. PRES.	BULK WT TEMP	AIR-WT TEMP	POT-WT TEMP	VIR-WT TEMP	V. POT-WT TEMP
212.71	10.94	8.93	NO DATA	1011.77	13.66	-1.389	-1.291	-0.167	-0.069
WIND DIR.	POT. TEMP.	VIR. TEMP.	V. POT. TEMP.	REL. HUMID.	REL. HUMID.	SPC. HUMID.	VAP. PRES.	V. VAP. PRES.	REF. INDEX
13.00	12.369	13.494	13.591	0.652E-03	00.93	7.049E-03	11.404	14.249	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIER ET AL, 1978):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.033 AT 0.01	MOMENTUM FLUX (N1/m2) -1.97E-01	FRICITION VELOCITY (meter/sec) 4.025E-01	WITH LONG. VELOCITY (meter/sec2) -1.620E-01	AIR DENSITY (kg/m3) 1.2296
GRAD. TEMP. GRAD. IN TEMP (meter/gram/2/2/2) 12.99	HUMIDITY FLUX (kg/sec m2) 4.25E-05	SCALING SPEC. HUMID. (kg/kg) -9.183E-05	WITH ABS. HUMIDITY (meter kg/sec m3) 4.545E-05	AIR SPECIFIC HEAT (J/cal./kg kel.) 2.415E-02
Z/L AT 0.01 0.033	LAT. HEAT FLUX (Watts/m2) 1.12E-02	SCALING POT. TEMP. (Kelvin) -3.727E-02	WITH POT. TEMPERATURE (meter Kel./sec) 1.506E-02	WATER LAT. HEAT VAP. (J/cal./kg) 5.9637E-05
Z/L AT 10 METERS 0.033	SEN. HEAT FLUX (Watts/m2) 1.87E-01	ROUGHNESS LENGTH (meter) 2.289E-04		VAP. PRES. AT WT LEVEL (millibar) 15.624
ROUEN OBSCUR. LENGTH (meter) 1.165E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.51E-02	DRAG COEF. AT 10 METERS (Dimensionless) 1.352E-02		ABS. HUMID. AT WT LEVEL (kg/m3) 1.180E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.28E-02			BAR. PRES. AT WT LEVEL (millibar) 1012.97
	ROUEN RATIO (no. unit) 0.166			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "BEST".

GRAD. RICH.	Z/L	MOMENTUM	LAT. HEAT	SEN. HEAT	SKY RAD.	TOTAL HEAT	ROUEN	FRICITION	SC. SPEC.	SC. POT.	ROUGH.	DRAG
NO. AT 0.01	AT 10M	FLUX	FLUX	FLUX	FLUX	FLUX	RATIO	VELOCITY	HUMIDITY	TEMP.	LENGTH	COEF.
16%	120%	87%	150%	80%	5%	13%	275%	43%	166%	4%	63%	87%
16%	16%	46%	41%	97%	5%	6%	137%	23%	64%	140%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: ZY050V1036  
 START TIME: 11:31:20 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.007 (0.02) AT 0.01	MOMENTUM FLUX (N1/m2) -2.22E-01 (6.0E-02)	FRICITION VELOCITY (meter/sec) 4.243E-01 (6.0E-02)
GRAD. TEMP. GRAD. IN TEMP (meter/gram/2/2/2) 12.99	HUMIDITY FLUX (kg/sec m2) 4.25E-05 (1.0E-06)	SCALING SPEC. HUMID. (kg/kg) -7.90E-05 (3.0E-05)
Z/L AT 0.01 0.007 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.06E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.447E-03 (2.0E-02)
Z/L AT 10 METERS 0.007 (0.02)	SEN. HEAT FLUX (Watts/m2) 3.71E-00 (3.0E+00)	ROUGHNESS LENGTH (meter) 2.089E-04 (6.0E-05)
ROUEN OBSCUR. LENGTH (meter) 1.412E-03	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.51E-02 (2.0E+01)	DRAG COEF. AT 10 METERS (meter) 1.507E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.40E-02 (3.0E+01)	
	ROUEN RATIO (no. unit) 0.062 (0.001)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "BEST".

GRAD. RICH.	Z/L	MOMENTUM	LAT. HEAT	SEN. HEAT	SKY RAD.	TOTAL HEAT	ROUEN	FRICITION	SC. SPEC.	SC. POT.	ROUGH.	DRAG
NO. AT 0.01	AT 10M	FLUX	FLUX	FLUX	FLUX	FLUX	RATIO	VELOCITY	HUMIDITY	TEMP.	LENGTH	COEF.
16%	16%	16%	17%	17%	0%	4%	182%	8%	20%	149%	26%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091100  
START TIME: 11:14:00 PST  
END TIME: 11:31:00 PST  
START DATE: 9 May 1972 (DAY 129)

PRINT DATE: 11 JUN 1972  
DATA SAMPLING RATE (CALL CHANNELS): 1/2 MIN  
DATA AVERAGING PERIOD: 30 MIN  
NUMERATOR: 1-UPPER LEVEL, 2-DOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	4.891	4.976	5.978	5.677	4.734	7.622	4.977
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZFOU KEY	SHAPE A	SHAPE B	VOLT. REF. B		
4.059	3.901	2.536	0.001	0.001	0.001	0.001	4.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	OFFSHORE	OFFSHORE	OFFSHORE	OFFSHORE	OFFSHORE
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH
1411 122907	1411 123671	0.183	1.25	0.008	0.008	0.008	0.008	0.008

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. A	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
(No. scans)	(No. scans)	(No. scans)	(Volts)	(Celsius)	(Celsius)	(m/sec)	(m/sec)	(mbars)	(msec)	(deg)
0	0	180	0	0.005	0.005	0.005	0.005	0.005	0.005	0.005

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE) AND ESCARPMENT CORRECTIONS TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(m/sec)	(Celsius)	(Celsius)	(deg)	(mbars)	(msec)	(Celsius)	(Celsius)
12.291	11.53	4.93	NO DATA	141.2	1011.7	4.734	13.694	12.547
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR.	BAR. PRES. 2	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(m/sec)	(Celsius)	(Celsius)	(deg)	(mbars)	(msec)	(Celsius)	(Celsius)
12.367	10.58	4.93	NO DATA	141.2	1011.7	4.734	13.694	12.547

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/kg)	(Percent)	(kg/kg)	(mbars)	(mbars)	(Celsius)
18.35	12.471	13.518	13.697	8.628-03	79.74	7.074-03	11.386	14.254	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AIR HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/kg)	(Percent)	(kg/kg)	(mbars)	(mbars)	(Celsius)
9.20	12.457	13.598	13.688	8.715-03	84.17	7.074-03	11.404	14.443	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905091100  
START TIME: 11:14:00 PST  
START DATE: 9 May 1972 (DAY 129)

MARINE SURFACE LAYER  
AND MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1972  
DATA SAMPLING RATE (CALL CHANNELS): 1/2 MIN  
DATA AVERAGING PERIOD: 30 MIN  
NUMERATOR: 1-UPPER LEVEL, 2-DOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BETTER, 1973):

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	LOCAL DERIVATIVES	PROFILE SLOPE
GRAD. RICHARDSON NUMBER (1-Stable, -Unstable) 0.005 AT 0.00	MOMENTUM FLUX (N/m <sup>2</sup> ) 3.29E-01	FRICITION COEF. 113 (Dimensionless) 5.17E-01	1. BULK FLUX IN DZ (N/m <sup>2</sup> ) 3.29E-01	1. BULK FLUX IN DZ (N/m <sup>2</sup> ) 3.29E-01
GEOMETRIC MEAN HEIGHT (Meter) and (Z1+Z2)/2 12.77	HUMIDITY FLUX (kg/m <sup>2</sup> s) 3.40E-01	SCALING COEF. 113 (kg/m <sup>2</sup> s) 3.40E-01	2. BULK FLUX IN DZ (kg/m <sup>2</sup> s) 3.40E-01	2. BULK FLUX IN DZ (kg/m <sup>2</sup> s) 3.40E-01
Z/L AT 0.00	ENT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.40E-01	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	3. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	3. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01
Z/L AT 16 METERS 0.005	ENT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.40E-01	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	4. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	4. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01
Z/L AT Z1 0.002	ENT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.40E-01	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	5. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	5. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01
Z/L AT Z2 0.005	ENT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.40E-01	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	6. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	6. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01
BOWEN-BOWENOV. ENGIN (Meters) 1.773E-03	TOTAL HEAT FLUX (Watts/m <sup>2</sup> ) 9.40E-01	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	7. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	7. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01
PS11 AT Z1: -0.043709 PS11 AT Z2: -0.021914 PS12 AT Z1: -0.059867 PS12 AT Z2: -0.022614	BOWEN RATIO (No. units) 0.078	SCALING COEF. 113 (Watts/m <sup>2</sup> ) 9.40E-01	8. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01	8. BULK FLUX IN DZ (Watts/m <sup>2</sup> ) 9.40E-01

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (m/sec <sup>2</sup> ) 9.7957	PROF. 113 TEMP. COEF. 0.24	PROF. 113 TEMP. COEF. 0.24	BULK TEMP. COEF. 0.001	BULK TEMP. COEF. 0.001
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and or Partial Derivatives  
Computation executed by insertion of

SHI 100 120 000 1 Kg/Kg

## \* COMMENTS:

WIND DIR. 141.2  
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NAVAL RESEARCH LAB WASHINGTON DC

F/G 4/2

THE DATA BASE FOR THE MAY 1979 MARINE SURFACE LAYER MICROMETEOR--ETC(U)

MAY 82 T V BLANC

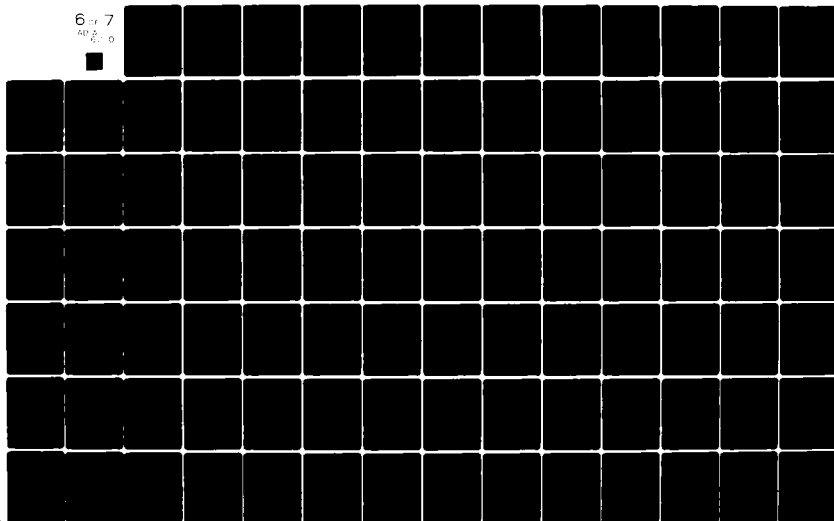
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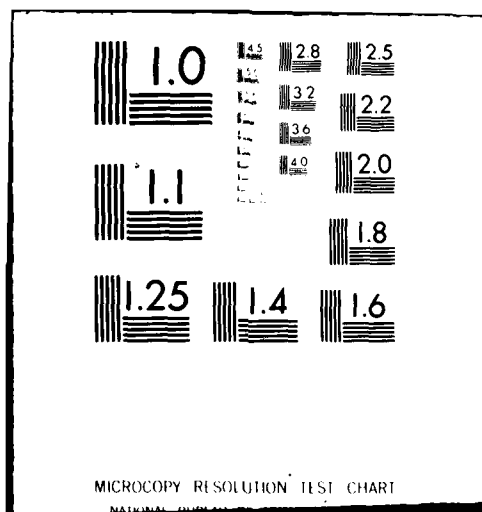
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RUN NUMBER: 7905091100  
 START TIME: 11: 14J PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.358	10.69	9.02	NO DATA	1011.83	13.699	-1.341	-1.243	-0.112	-0.014

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	AMS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
14.00	12.456	13.587	13.685	8.705E-03	80.03	7.081E-03	11.470	14.331	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.034 AT GMH	MOMENTUM FLUX (Nt/m2) -1.80E-01	FRICTION VELOCITY (Meters/sec) 3.906E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.526E-01	AIR DENSITY (Kg/m3) 1.2293
SCHEMATIC MEAN HEIGHT (Meter) GMH-(21*Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.41E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.190E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.413E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4153E 02
Z/L AT GMH -0.043	LAT. HEAT FLUX (Watts/m2) 1.09E 02	SCALING POT. TEMP. (Kelvin) -3.643E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.473E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9032E 05
Z/L AT 10 METERS -0.033	SEN. HEAT FLUX (Watts/m2) 1.77E 01	ROUGHNESS LENGTH (Meters) 2.061E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.664
MONIN-OBUKHOV LENGTH (Meters) -3.052E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.79E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.335E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.103E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.53E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.03
	BOWEN RATIO (no units) 0.162			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
127%	134%	81%	147%	108%	5%	14%	255%	40%	107%	67%	60%	81%
176%	170%	46%	41%	98%	5%	6%	139%	23%	64%	121%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091100  
 START TIME: 11: 14J PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.012 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.39E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.367E-01 (6.0E-02)
SCHEMATIC MEAN HEIGHT (Meter) GMH-(21*Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.20E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.00E-05 (3.0E-05)
Z/L AT GMH 0.015 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.06E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -6.60E-03 (2.0E-02)
Z/L AT 10 METERS -0.012 (0.02)	SEN. HEAT FLUX (Watts/m2) 6.20E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 3.453E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -0.648E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.79E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.660E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.67E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.081 (0.01)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
79%	90%	31%	8%	194%	0%	2%	14%	15%	21%	121%	49%	33%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905091130  
START TIME: 11:32: 0 PST  
END TIME: 12: 2:10 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOLT.RFF.A	TEMP.STRUC.1	TEMP.STRUC.2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.2	SKY RAD.	WIND DIR.
6.265	0.061	0.061	4.897	4.980	5.989	5.661	4.736	7.169	4.967
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT.REF.B		
4.078	3.873	2.535	0.001	0.001	0.001	0.001	6.235		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No.1	No.2	UPWIND NEAR	UPWIND 1 AND	DP1FCAL	DP2FCAL	WTF1CAL	WS1FC	WS2FC
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 123399	1421 124109	0.183	131	-0.008	-0.050	0.000	0.992	0.992

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT.REF.DIV	VOLT.REF.DIV	Z-RO REF.DIV	AC VOLT.FLUX	AC FREQ.FLUX	FL VOLTAGE	AC FREQUENCY
(No.scans)	(No.scans)	(No.scans)	A(No.).005V	B(No.).005V	(No.).002V	(No.).15V	(No.).1Hz	(V)	(Hz)
0	0	180	0	0	0	0	0	115.3	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DEW POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.340	11.37	8.93	NO DATA	314.6	1010.87	-1.00E-03	13.718	125.53
AIR TEMP.2	WIND SPEED2	DEW POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter ASL)	(Millibar)			
12.411	10.55	9.06	NO DATA	-0.31	1011.96			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP.1	VIR. TEMP.1	V.POT. TEMP.1	ARS. HUMID.1	REL. HUMID.1	SPEC. HUMID.1	VAP. PRES.1	S. VAP. PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.520	13.562	13.742	8.648E-03	79.68	7.041E-03	11.395	14.301	NO DATA
HEIGHT, Z2	POT. TEMP.2	VIR. TEMP.2	V.POT. TEMP.2	ARS. HUMID.2	REL. HUMID.2	SPEC. HUMID.2	VAP. PRES.2	S. VAP. PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.501	13.644	13.734	8.730E-03	79.99	7.102E-03	11.596	14.303	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905091130  
START TIME: 11:32: 0 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.009 AT GMM	MOMENTUM FLUX (Nt/m2) -2.47E-01	FRICTION VELOCITY (Meters/sec) 4.482E-01	GENERAL FORM DN/DZ= 1/(N1-N2) * 1/ln(Z1/Z2) * (Z1+Z2)/Z2	CORREL FORM N SLOPE= 1/(lnZ1-PS1)-(lnZ2-PS1))/ (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.20E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.811E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ= 9.12E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1-PS11 WS SLOPE= -8.93E-01
Z/L AT GMM 0.012	LAT HEAT FLUX (Watts/m2) 7.91E-01	SCALING POT. TEMP. (Kelvin) 1.361E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ= -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1-PS12 SH SLOPE= 9.30E-03
Z/L AT 10 METERS 0.009	SEN. HEAT FLUX (Watts/m2) -7.58E-00	ROUGHNESS LENGTH (Meters) 3.317E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ= 2.09E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1-PS13 PTK SLOPE= 3.97E-01
Z/L AT Z1 0.017	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.00E-03	DRAW COEFF. AT 10 METERS (Dimensionless) 1.826E-05		N-TEMP. STRUC. (K/M 2/3) Z-HEIGHT (M) Vert Axis PS1-NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.009	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.28E-02			
MINIM. DRUKHOV LENGTH (Meters) 1.081E-03	ROSEN RATIO (no units) -0.096			
PS11 AT Z1= -0.079744 PS11 AT Z2= -0.043001 PS12 AT Z1= -0.107816 PS12 AT Z2= -0.054055				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PRANDTL NUMBER	PRANDTL NUMBER	BULK TRANF. COEFF.	BULK MOISTURE TRANF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2= +/- .001-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2289

AIR SPECIFIC HEAT  
(J/cal. Kg Kel.)  
2.4151E-02

WATER LAT. HEAT VAP.  
(J/cal. Kg)  
5.4031E-05

RUN NUMBER: 7905091130  
 START TIME: 11:32: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP.STRUC. (Kelvin-2/3)	BAR.PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	UIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.402	10.65	9.04	NO DATA	1011.87	13.718	-1.316	-1.218	-0.084	0.014
HEIGHT (Meters)	POT.TEMP. (Celsius)	UIR.TEMP. (Celsius)	V.POT.TEMP. (Celsius)	ABS.HUMID. (Kg/m3)	REL.HUMID. (Percent)	SPEC.HUMID. (Kg/Kg)	VAP.PRES. (Millibars)	S.VAP.PRES. (Millibars)	REF.INDEX (Kelvin-2/3)
10.06	12.500	13.634	13.732	0.721E-03	79.96	7.09E-03	11.493	14.374	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL,1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.034 AT 10M	MOMENTUM FLUX (Nt/m2) -1.86E-01	FRICTION VELOCITY (Meters/sec) 3.887E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.511E-01	AIR DENSITY (Kg/m3) 1.2292
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.39E-05	SCALING SPEC.HUMID. (Kg/Kg) -9.195E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.393E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4153E 02
Z/L AT 10M -0.042	LAT.HEAT FLUX (Watts/m2) 1.09E 02	SCALING POT.TEMP. (Kelvin) -3.583E-02	WITH POT.TEMPERATURE (Meter Kel./sec) 1.393E-02	WATER LAT.HEAT VAP. (ITcal./Kg) 5.9030E 05
Z/L AT 10 METERS -0.033	SEN.HEAT FLUX (Watts/m2) 1.73E 01	ROUGHNESS LENGTH (Meters) 2.026E-04		VAP.PRES.AT WT LEVEL (Millibar) 15.684
MONIN-OBUKHOV LENGTH (Meters) -3.073E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.00E 03	DRAG COEFF.AT 10 METERS (Dimensionless) 1.333E-03		ABS.HUMID.AT WT LEVEL (Kg/m3) 1.185E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.74E 02			BAR.PRES.AT WT LEVEL (Millibar) 1013.07
	BOWEN RATIO (no units) 0.159			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
118%	128%	89%	151%	94%	5%	12%	245%	44%	107%	49%	64%	89%
171%	171%	46%	41%	99%	5%	6%	140%	23%	64%	122%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091130  
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 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD.RICHARDSON NUMBER (+Stable, -Unstable) -0.009 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -2.07E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.090E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.14E-05 [8.0E-06]	SCALING SPEC.HUMID. (Kg/Kg) -7.927E-05 [3.0E-05]
Z/L AT 10M -0.011 [0.02]	LAT.HEAT FLUX (Watts/m2) 1.02E 02 [2.0E+01]	SCALING POT.TEMP. (Kelvin) -6.426E-04 [2.0E-02]
Z/L AT 10 METERS -0.009 [0.02]	SEN.HEAT FLUX (Watts/m2) 4.52E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.544E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.160E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.00E 03 [2.0E+01]	DRAG COEFF.AT 10 METERS (Meters) 1.466E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.92E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.067 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD.RICH. NO.AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT.HEAT FLUX	SEN.HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL.SPEC HUMIDITY	SCL.POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
108%	106%	16%	17%	275%	0%	3%	165%	8%	22%	134%	26%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7705091200  
START TIME: 17: 200 PST  
END TIME: 17:52:30 PST  
START DATE: 7 May 1977 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AV. AGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* OBSERVED CHANNEL RAW DATA (AVERAGE SDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL.T.RFF.1	TEMP.STRUC.1	TEMP.STRUC.2	DIR. POINT1	DIR. POINT2	WIND SPEED1	WIND SPEED2	BAR.PRES.2	SKY RAD.	WIND DIR.
0.205	0.001	0.661	4.849	4.941	6.161	5.876	4.724	7.235	4.965
BULK WT. TEMP	AC VOLTAGE	MANUAL FLAG	ZIRU RFF.	SPARE A	SPARE B	VOIT.RFF.1			
11.03	1.092	0.337	0.301	0.391	0.301	0.391	6.205		

## \* OBSERVED CHANNEL RAW DATA (AVERAGE):

ESCAPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPMENT CORRECTIONS:

No.1	No.2	UPWIND REAR	UPWIND LAND	DP.FCAL	DP.FCAL	WTF.FCAL	WS.FCAL	WS.FCAL	WS.FCAL
AIR TEMP.1	AIR TEMP.2	HEIGHT/LENGTH	PATH(Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)	(Coeff.)
1411.124620	1421.125144	0.183	1.48	-0.100	-0.950	0.300	0.992	0.952	

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	FIELD CORR.	DATA CORR.	VOL.T.RFF.DEV	VOL.T.RFF.DEV	ZIRU RFF.DEV	AC VOLT.FLUX	AC FREQ.FLUX	AC VOLTAGE	AC FREQUENCY
(No.0000)	(No.0000)	(No.0000)	(No.0.005V)	(No.0.005V)	(No.0.005V)	(No.0.75V)	(No.0.1Hz)	(VAC)	(Hz)
0	0	0	0	0	0	0	0	115.4	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP.1	WIND SPEED1	DIR. POINT1	TEMP.STRUC.1	WIND DIR.	BAR.PRES.1	SKY RAD.	BULK WT. TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Deg.True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.462	11.05	0.661	NO DATA	313.8	1010.69	-1.01E-03	13.762	285.648
AIR TEMP.2	WIND SPEED2	DIR. POINT2	TEMP.STRUC.2	TIDE TABLE	BAR.PRES.2			
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xM-2/3)	(Meter MSL)	(Millibar)			
12.514	11.74	0.662	NO DATA	-0.41	1011.79			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT.TEMP.1	VIR.TEMP.1	V.POT.TEMP.1	ABS.HUMID.1	REL.HUMID.1	SPEC.HUMID.1	VAP.PRES.1	S.VAP.PRES.1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
18.35	12.642	13.661	13.841	8.479E-03	77.54	6.907E-03	11.175	14.414	NO DATA
HEIGHT, Z2	POT.TEMP.2	VIR.TEMP.2	V.POT.TEMP.2	ABS.HUMID.2	REL.HUMID.2	SPEC.HUMID.2	VAP.PRES.2	S.VAP.PRES.2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xM-2/3)
9.29	12.645	13.728	13.818	8.505E-03	78.17	6.985E-03	11.319	14.479	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7705091200  
START TIME: 17: 200 PST  
END TIME: 17:52:30 PST  
START DATE: 7 May 1977 (DAY 127)

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## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.014	MOMENTUM FLUX (Nt/m2) -2.80E-01	FRICTION VELOCITY (Meters/sec) 4.793E-01	GENERAL FORM: $DN/DZ = (N1-N2)/[Ln(Z1/Z2)]$	GENERAL FORM: $N'SLOPE = [Ln(Z1-PSI) - Ln(Z2-PSI)] / (N1-N2)$
HUMIDITY MEAN HEIGHT (Meter) $Ch = (Z1+Z2)/2$ 12.79	HUMIDITY FLUX (Kg/sec.m2) 3.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.683E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ= 1.01E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 8.35E-01
Z/L AT GMM 0.020	LAT. HEAT FLUX (Watts/m2) 0.10E-01	SCALING POT. TEMP. (Kelvin) 2.586E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ= -9.01E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -9.64E-03
Z/L AT 10 METERS 0.015	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.01E-03	ROUGHNESS LENGTH (Meters) 4.171E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= 4.16E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= 2.89E-01
Z/L AT Z1 0.023	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.43E-04	DRAW COEFF. AT 10 METERS (Dimensionless) 1.90E-03		N=Ln(TEMP.STRUC. (KxM-2/3)) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.014	BOWEN RATIO (No units) -0.187			
DRAG BUDGET LENGTH (Meters) 0.115E-02				
PSI1 AT Z1= 0.132476 PSI1 AT Z2= 0.136339 PSI2 AT Z1= 0.128482 PSI2 AT Z2= 0.069107				

## \* GENERAL CONSTANTS:

GRAVITATION	PROF. COEFF.	PROF. COEFF.	BULK COEFF.	BULK COEFF.
9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2282

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4150E-02

WATER LAT. HEAT VAP  
(Jcal./Kg)  
5.9825E-05

RUN NUMBER: 7905091200  
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\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xM-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.508	11.65	8.80	NO DATA	1011.69	13.762	-1.254	-1.156	-0.842	0.056

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel.xM-2/3)
10.00	12.606	13.720	13.810	8.573E-03	78.10	6.970E-03	11.302	14.472	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.029 AT 0M	MOMENTUM FLUX (Nt/m2) -2.04E-01	FRICTION VELOCITY (Meters/sec) 4.075E-01	WITH LONG. VLOCITY (Meter2/sec2) -1.661E-01	AIR DENSITY (Kg/m3) 1.2286
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.82E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.628E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.820E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4151E 02
Z/L AT 0M -0.036	LAT. HEAT FLUX (Watts/m2) 1.19E 02	SCALING POT. TEMP. (Kelvin) -3.376E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.376E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.028	SEN. HEAT FLUX (Watts/m2) 1.71E 01	ROUGHNESS LENGTH (Meters) 2.389E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.726
MONIN-OBUKHOV LENGTH (Meters) -3.586E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.01E 03	DRAW COEFF. AT 10 METERS (Dimensionless) 1.359E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.188E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.73E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.89
	BOWEN RATIO (no units) 0.143			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 0M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
92%	165%	82%	146%	68%	5%	12%	214%	41%	105%	27%	61%	82%
173%	173%	46%	40%	101%	5%	6%	141%	23%	63%	124%	43%	40%

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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.001 [0.001] AT 0M	MOMENTUM FLUX (Nt/m2) -2.32E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.333E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.49E-05 [8.0E 06]	SCALING SPEC. HUMID. (Kg/Kg) 8.114E-05 [3.0E-05]
Z/L AT 0M 0.001 [0.001]	LAT. HEAT FLUX (Watts/m2) 1.11E 02 [7.0E+01]	SCALING POT. TEMP. (Kelvin) 1.515E-02 [2.0E-02]
Z/L AT 10 METERS -0.001 [0.001]	SEN. HEAT FLUX (Watts/m2) -2.32E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.124E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -1.675E 04	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.01E 03 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.540E-04 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 8.97E 02 [3.0E+01]	
	BOWEN RATIO (no units) 0.011 [0.001]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 0M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
112%	111%	17%	19%	552%	0%	4%	212%	9%	26%	177%	29%	19%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091230  
START TIME: 12:32:40 PST  
END TIME: 13: 2:50 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.061	4.893	4.967	6.520	6.031	4.706	7.045	4.790
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.133	3.074	2.538	0.001	0.001	0.001	0.001	6.290		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND LAND	DPTICAL	DPTICAL	WTEFAL	WTEFAL	WTEFAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)	(Coeff.)
1411 124969	1421 125402	0.185	143	0.008	0.050	0.000	3.592	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEW	VOLT. REF. DEW	ZERO REF. DEW	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. > 0.005V)	B (No. > 0.005V)	(No. > 0.020V)	(No. > 50)	(No. > 100)	(VAC)	(Hz)
0	0	180	0	0	0	0	0	115.4	59.87

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin/2/3)
12.477	12.17	8.85	NO DATA	314.8	1010.72	-9.02E-02	13.772	105.679
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin/2/3)	(Meter mSL)	(Millibar)			
12.540	11.23	8.98	NO DATA	-0.47	1011.81			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
18.35	12.677	13.713	13.893	0.595E-03	78.43	7.662E-03	11.330	14.447	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin/2/3)
9.20	12.630	13.767	13.857	0.677E-03	78.90	7.065E-03	11.443	14.504	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091230  
START TIME: 12:32:40 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.016 AT GHM	MOMENTUM FLUX (Nt/m2) -2.97E-01	FRICTION VELOCITY (Meters/sec) 4.914E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/[ln(Z1/Z2)]]$	GENERAL FORM: $N/SLOPE = [(lnZ1-PS1)-(lnZ2-PS1)] / (N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GHM = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 3.29E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.446E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DMS/DZ = 1.05E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 8.14E-01
Z/L AT GHM 0.023	LAT. HEAT FLUX (Watts/m2) 8.12E 01	SCALING POT. TEMP. (Kelvin) 3.158E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -9.93E-03
Z/L AT 10 METERS 0.018	SEN. HEAT FLUX (Watts/m2) -1.93E 01	ROUGHNESS LENGTH (Meters) 4.539E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 5.17E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 1.71E 01
Z/L AT Z1 0.055	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.83E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.895E-03		N=Lat. HEAT FLUX (Kw/2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 0.016	TOTAL HEAT BUDGET FLUX (Watts/m2) -9.21E 02			
MININ-ORUKHOV LENGTH (Meters) 5.610E 02	BOWEN RATIO (no units) -0.237			
PS11 AT Z1 = -0.153736 PS11 AT Z2 = -0.077078 PS12 AT Z1 = -0.207752 PS12 AT Z2 = -0.104159				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT	CRAVITATION	PROFILE TUR. PRANDTL NUMBFR	PROFILE TUR. SCHMIDT NUMBFR	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
(No units)	(M/sec 2)				
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2281

AIR SPECIFIC HEAT  
(J/Kelvin/Kg)  
2.4150E 02

WATER LAT. HEAT VAP.  
(J/Kelvin/Kg)  
5.9023E 03

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905091230  
 START TIME: 12:32:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.535	11.34	8.97	NO DATA	1011.72	13.772	-1.237	-1.139	-0.011	0.087

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.533	13.761	13.859	8.669E-03	78.84	7.057E-03	11.430	14.498	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.026 AT GMH	MOMENTUM FLUX (N/m2) -2.18E-01	FRICTION VELOCITY (Meters/sec) 4.210E-01	WITH LONG. VFLOCITY (Meter2/sec2) -1.773E-01	AIR DENSITY (Kg/m3) 1.2284
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.81E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.304E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.812E-05	AIR SPECIFIC HEAT (J/cal./Kg Kel.) 2.4152E 02
Z/L AT GMH 0.033	LAT. HEAT FLUX (Watts/m2) 1.19E 02	SCALING POT. TEMP. (Kelvin) -3.297E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.388E-02	WATER LAT. HEAT VA. (J/cal./Kg) 5.9022E 05
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 1.72E 01	ROUGHNESS LENGTH (Meters) 2.675E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.736
MONIN-OBUKHOV LENGTH (Meters) -3.920E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.83E 02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.378E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.188E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.46E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.92
	BOWEN RATIO (no units) 0.145			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
87%	101%	81%	146%	63%	5%	12%	209%	48%	106%	23%	60%	81%
174%	174%	46%	40%	100%	5%	6%	142%	23%	63%	125%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091230  
 START TIME: 12:32:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.002 [0.02] AT GMH	MOMENTUM FLUX (N/m2) -2.46E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.466E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.40E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.85E-05 [3.0E-05]
Z/L AT GMH 0.003 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.11E 02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 2.159E-02 [2.0E-02]
Z/L AT 10 METERS 0.002 [0.02]	SEN. HEAT FLUX (Watts/m2) -5.29E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 3.451E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 5.150E 03	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.83E 02 [2.0E+01]	DRAG COEFF. AT 10 METERS (Meters) 1.549E 03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.72E 02 [3.0E+01]	
	BOWEN RATIO (no units) -0.010 [0.68]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCL. SPEC. HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
112%	112%	17%	70%	355%	0%	4%	243%	8%	25%	182%	27%	18%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091300  
START TIME: 13: 3: 0 PST  
END TIME: 13:33:16 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL.T. REF. A	TEMP. STRUC. 1	TEMP. STRUC. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
5.205	6.661	6.001	4.911	4.994	6.565	6.226	4.720	6.867	5.047

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL.T. REF. B
4.165	5.526	2.535	0.001	9.001	0.001	0.001	6.295

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
AIR TEMP. 1	AIR TEMP. 2	UPWIND NEAR	UPWIND LAND	UPWIND	UPWIND	UPWIND	UPWIND	UPWIND
1411 125109	1401 125387	HEIGHT/LENGTH	PATH(Meter)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
		0.103	145	-0.308	-0.050	0.030	0.592	0.952

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOL.T. REF. DEV	VOL.T. REF. DEV	ZERO REF. DEV	AC VOL.T. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A(No.) 0.005V	B(No.) 0.005V	(No.) 0.02V	(No.) 5V	(No.) 1Hz	(VAC)	(Hz)
0	1	179	0	0	0	0	0	115.4	59.89

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUC. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Celsius)
12.511	12.62	9.02	NO DATA	316.6	1010.65	-9.50E-02	13.804	265.685

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUC. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kel.xm-2/3)	(Meter MSL)	(Millibar)
12.539	11.58	9.14	NO DATA	-0.51	1011.75

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
18.35	12.691	13.741	13.921	8.696E-03	79.24	7.681E-03	11.457	14.459	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kel.xm-2/3)
9.20	12.629	13.779	13.869	8.772E-03	79.76	7.141E-03	11.566	14.501	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091300  
START TIME: 13: 3: 0 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.018 AT GMM	MOMENTUM FLUX (N/m2) -3.52E-01	FRICTION VELOCITY (Meters/sec) 5.356E-01	GENERAL FORM: DN/DZ = 1/(N1-N2) / (1/n(Z1/Z2) * (Z1/Z2)^(1/2))	GENERAL FORM: N SLOPE = 1/(n21-PSI1) - (Ln Z2-PSI1) / (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMM = (Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 3.53E-05	SCALING SPEC. HUMID. (Kg/Kg) -5.372E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.16E 01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 7.47E-01
Z/L AT GMM 0.026	LAT. HEAT FLUX (Watts/m2) 8.73E 01	SCALING POT. TEMP. (Kelvin) 4.151E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 1.01E 04
Z/L AT 10 METERS 0.020	SEN. HEAT FLUX (Watts/m2) -2.76E 01	ROUGHNESS LENGTH (Meters) 6.654E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 6.89E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 1.30E 01
Z/L AT Z1 0.036	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.58E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 2.010E-03		N=LATENT HEAT FLUX (KJ/m 2/3) Z=HEIGHT (M) Vert. Axis PSI=NDN CT2 SLOPE=NO DATA
ADWIN-DRAWING LENGTH (Meters) 5.071E 02	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.98E 02			
PSI1 AT Z1 = -6.176047 PSI1 AT Z2 = 0.985075 PSI2 AT Z1 = -6.229847 PSI2 AT Z2 = 0.115237	BOWEN RATIO (no units) -0.316			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units) 0.4	GRAVITATION ACCELERATION (m/sec 2) 9.7979	PROFILE TUX. PRANDTL NUMBER 0.74	PROFILE TUX. SCHMIDT NUMBER 0.74	BULK SEN HEAT TRANSF. COEFF. 0.97E-03	BULK MOISTURE TRANSF. COEFF. 1.30E-03
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## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative  
Computation executed by insertion of:

SMI SLOPE +/- 0.001 K/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2279

AIR SPECIFIC HEAT  
(J/Kg.Kel)  
2.4154E 02

WATER LAT HEAT CAP  
(J/Kg.Kel)  
5.9023E 04

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905091300  
 START TIME: 13: 31: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel.xm-2/3) NO DATA	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.535	11.71	9.13		1011.65	13.804	-1.268	-1.170	-0.029	0.069

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kel.xm-2/3) NO DATA
10.00	12.633	13.775	13.873	8.763E-03	79.70	7.134E-03	11.553	14.497	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.024 AT GMM	MOMENTUM FLUX (Nt/m2) -2.36E-01	FRICTION VELOCITY (Meters/sec) 4.386E-01	WITH LONG. VLOCITY (Meter2/sec2) -1.923E-01	AIR DENSITY (Kg/m3) 1.2283
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.85E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.020E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.859E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4154E-02
Z/L AT GMM -0.031	LAT. HEAT FLUX (Watts/m2) 1.20E-02	SCALING POT. TEMP. (Kelvin) -3.330E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.461E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9022E-05
Z/L AT 10 METERS -0.024	SFN. HEAT FLUX (Watts/m2) 1.81E-01	ROUGHNESS LENGTH (Meters) 3.079E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.768
MONIN-OBUKHOV LENGTH (Meters) -4.211E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.58E-02	DRAG COEF. AT 10 METERS (Dimensionless) 1.403E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.19E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.85
	BOWEN RATIO (no units) 0.151			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
78%	92%	76%	143%	56%	5%	13%	199%	38%	105%	18%	58%	76%
173%	173%	46%	41%	101%	5%	7%	141%	23%	64%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091301  
 START TIME: 13: 31: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTS:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.004 (0.001 AT GMM)	MOMENTUM FLUX (Nt/m2) -2.80E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.752E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.56E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.644E-05 (3.0E-05)
Z/L AT GMM 0.036 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.13E-02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 3.194E-02 (2.0E-02)
Z/L AT 10 METERS 0.005 (0.02)	SFN. HEAT FLUX (Watts/m2) -1.13E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 4.348E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 2.166E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.58E-02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.637E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.44E-02 (3.0E+01)	
	BOWEN RATIO (no units) -0.043 (0.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE BULK WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
112%	114%	21%	17%	211%	6%	5%	296%	11%	25%	146%	35%	70%

\* END OF DATA RUN

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905091330  
START TIME: 13:33:20 PST  
END TIME: 14: 3:30 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.061	0.011	4.921	5.062	6.147	5.083	4.722	6.481	5.617
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
4.167	3.818	2.538	0.901	0.001	0.001	0.001	6.215		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DIPICAL	DIPICAL	WIPICAL	WIPICAL	WIPICAL	WIPICAL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 125928	1421 125926	0.183	145	0.908	-0.056	0.049	0.049	0.049	0.049

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 1.605V)	B (No. 1.005V)	(No. 1.002V)	(No. 1.5V)	(No. 1Hz)	(V)	(Hz)
0	0	180	3	0	0	0	0	115.4	59.82

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	PAR. PRES. 1	SKY RAD.	BULK WT TEMP	MEAN AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(deg. True)	(Millibar)	(Watt/m2)	(Celsius)	(Kelvin)
12.593	11.82	9.07	NO DATA	318.0	1010.65	-9.94E-02	13.805	285.703
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.593	10.96	9.19	NO DATA	-0.51	1011.75			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.773	13.828	14.008	8.722E-03	79.12	7.109E-03	11.502	14.537	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.24	12.683	13.837	13.928	8.830E-03	79.74	7.165E-03	11.605	14.554	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091330  
START TIME: 13:33:20 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.037 AT GMM	MOMENTUM FLUX (Nt/m2) -1.04E-01	FRICTION VELOCITY (Meters/sec) 3.869E-01	GENERAL FORM: $DN/DZ = (N1-N2) / (1 + (N1^2/Z1^2) + (N2^2/Z2^2))^{1/2}$	GENERAL FORM: $N/SLOPE = (1 + (N1^2/Z1^2) + (N2^2/Z2^2))^{1/2}$
QUADRATIC MEAN HEIGHT (Meter) GMM: $(Z1^2 + Z2^2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 2.14E-05	SCALING SPEC. HUMID. (Kg/Kg) -4.513E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 9.58E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.03E-00
Z/L AT GMM 0.066	LAT. HEAT FLUX (Watts/m2) 5.29E-01	SCALING POT. TEMP. (Kelvin) 5.669E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -6.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -1.20E-04
Z/L AT 10 METERS 0.046	SEN. HEAT FLUX (Watts/m2) -2.43E-01	ROUGHNESS LENGTH (Meters) 1.991E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.00E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 1.07E-01
Z/L AT 22 0.042	SKY AND SOLAR HEAT FLUX (Watts/m2) 9.04E-02	DRAW CODE AT 10 METERS (Dimensionless) 1.249E-03		N=LNTMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CTR SLOPE=NO DATA
MONIN-BRUKHOV LENGTH (Meters) 2.170E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.75E-02			
PS11 AT Z1 = -0.397508 PS11 AT Z2 = -0.199295 PS12 AT Z1 = -0.537172 PS12 AT Z2 = -0.269318	ROMAN RATIO (no units) -6.460			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUM. PRANDTL NUMBER 0.74	PROFILE TUM. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 6.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2276

AIR SPECIFIC HEAT  
(J/cal./Kg Kel.)  
2.4154E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.919E-03

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2: +/- .001-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905091330  
 START TIME: 13:33:20 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUCT. (Kelvin-M/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.593	11.07	9.18	NO DATA	1011.66	13.865	-1.213	-1.115	0.031	0.129

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	RFL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M/2/3)
10.03	12.691	13.836	13.934	8.791E-03	79.67	7.150E-03	11.593	14.552	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL. 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.028 AT GMH	MOMENTUM FLUX (Nt/m2) -2.05E-01	FRICTION VELOCITY (Meters/sec) 4.082E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.667E-01	AIR DENSITY (Kg/m3) 1.2280
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.55E-05	SCALING SPFC HUMID. (Kg/Kg) -9.083E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.554E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
Z/L AT GMH -0.035	LAT. HEAT FLUX (Watts/m2) 1.13E 02	SCALING POT. TEMP. (Kelvin) -3.270E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.335E-02	WATER LAT. HEAT VAL. (ITcal./Kg) 5.9019E 05
Z/L AT 10 METERS -0.027	SFN. HEAT FLUX (Watts/m2) 1.66E 01	ROUGHNESS LENGTH (Meter) 2.404E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.770
MONIN-OBUKHOV LENGTH (Meters) -3.717E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.04E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.360E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.75E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.86
	BOWEN RATIO (no units) 0.147			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	T. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
83%	114%	89%	152%	61%	5%	10%	213%	45%	107%	14%	65%	89%
175%	175%	46%	41%	103%	5%	7%	144%	23%	64%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091330  
 START TIME: 13:33:20 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
 DATA AVERAGING PERIOD: 30 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.016 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.98E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.009E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.04E-05 [8.0E-06]	SCALING SPFC HUMID. (Kg/Kg) -7.379E-05 [3.0E-05]
Z/L AT GMH 0.022 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.99E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 4.112E-02 [2.0E-02]
Z/L AT 10 METERS 0.017 [0.02]	SFN. HEAT FLUX (Watts/m2) -9.13E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.239E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 5.794E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -9.04E 02 [2.0E+01]	DRAG COEF. AT 10 METERS (Dimensionless) 1.376E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -8.15E 02 [3.0E+01]	
	BOWEN RATIO (no unit) -0.097 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
173%	186%	6%	34%	231%	0%	6%	318%	3%	32%	124%	9%	5%

JOINT RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

entry number: 79638544  
 start time: 14:31:40.00  
 end time: 14:33:50.00  
 test file: 9.000.1977 (PA) 1.00

PRINT DATE: 1: JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

NO. 01	NO.01	NO.02	NO.03	NO.04	NO.05	NO.06	NO.07	NO.08	NO.09
TEMP. SENS. 1	TEMP. SENS. 1	TEMP. SENS. 2	DEW POINT1	DEW POINT2	WIND SPEED1	WIND SPEED2	HAR. PRE 5.0	SKY RAD.	WIND DIR
0.000	0.000	0.000	4.936	5.015	6.470	6.194	4.713	6.011	4.936
NO. 10	NO.11	NO.12	NO.13	NO.14	NO.15	NO.16	NO.17		
WIND S. 1000 FT. PER HOUR	WIND S. 1000 FT. PER HOUR	WIND S. 1000 FT. PER HOUR	WIND S. 1000 FT. PER HOUR	WIND S. 1000 FT. PER HOUR	SPARK A	SPARK B	VOLT. REF. B		
0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.205		

[illegible][illegible][illegible][illegible]

Phone (Home): 72 059 1400  
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MARINE SURFACE LAYER  
NRE MICROSTRUCTURE  
CAN. J. FISH. AQUAT. SCI. 48: 100-108, 1991

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 4/MIN  
DATA AVERAGING PERIOD: 30 MIN  
SIGNATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

STABILITY		FLUX PARAMETERS (+DOWN, -DOWN)		BOUNDING PARAMETERS		PARTIAL DERIVATIVES		PRECISE SLOPES (+INNER, WITH HEIGHT)	
GRAND RICHARDSON NUMBER (Constant, Dimensionless)		MOISTURE FLUX (kg/s/m2)		FRICTION VELOCITY (meters/sec)		GENERAL FORM DSW/DZ = (DN1-N2)/(Z11+(Z1-Z2)*Z1)		GENERAL FORM N2 SLOPE = (Ln(Z1-P1))/(Ln(Z2-P1)-Ln(N2))	
0.639		-0.0001		9.654E-01		(Z1-Z2)*Z1		(Z1-Z2)*Z1	
THERMOCHEMICAL HEIGHT (meters) (Unit = (Z1-Z2)/(1-Z2))		LUMINOUS FLUX (kg/s/m2)		THERMAL SPEED BOUND (kg/kg)		N-WIND SPEED (m/s)		N-WIND SPEED (m/s)	
10.77		2.09E-05		-4.49E-07		DSW/DZ = -1.33E-01		Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL GRAD (K/m)		LATENT FLUX (watts/m2)		SCALING POT. TEMP. (kelvin)		N-SPEC. HUMIDITY (kg/kg)		N-SPEC. HUMIDITY (kg/kg)	
0.004		-7.94E-01		5.978E-02		Z-HEIGHT (meters)		Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL FLUXES (watts)		THERMAL FLUX (watts/m2)		SOUNDNESS LENGTH (meters)		N-POT. TEMP. (kelvin)		N-POT. TEMP. (kelvin)	
0.0001		-3.01E-01		2.347E-04		Z-HEIGHT (meters)		Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL FLUXES (watts)		SKY AND SOLAR HEAT FLUX (watts/m2)		DRAG COEFF. AT 10 METERS (Dimensionless)		D17/DZ = 1.21E-02		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
0.0001		0.00E-02		1.23E-05		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL FLUXES (watts)		TOTAL HEAT BUDGET FLUX (watts/m2)		DRAG COEFF. AT 10 METERS (Dimensionless)		D17/DZ = 1.21E-02		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
0.0001		0.14E-02		1.23E-05		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL FLUXES (watts)		ROSEN KELLID (no units)		DRAG COEFF. AT 10 METERS (Dimensionless)		D17/DZ = 1.21E-02		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
0.0001		-6.55E-5		1.23E-05		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
THERMAL FLUXES (watts)		ROSEN KELLID (no units)		DRAG COEFF. AT 10 METERS (Dimensionless)		D17/DZ = 1.21E-02		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	
0.0001		-6.55E-5		1.23E-05		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111		RELATIVE STRUCT. (K/m) 2/3 Z-HEIGHT (m) Vert Axis P11-P111	

TYPE OF METHOD	CONCENTRATION	TEMPERATURE	PROBABLE	POUR	POUR
CONCENTRATION	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE
CONCENTRATION	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE
0.4	0.74	0.74	0.74	0.91-0.3	1.32-0.3

$$-511 = -511.2 \quad 1/2 \quad 613 \quad 5 \quad 104/104$$

AIR DENSITY  
(KG/M<sup>3</sup>)  
1.2273

AIR SPECIFIC HEAT  
(1 cal./kg deg.)  
2.4155E 02

WATER LAT. HEAT VAP.  
(ITcal./kg)  
5.9018E 09

RUN NUMBER: 7905091400  
 START TIME: 14: 3:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICRO. ELECTROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

# \* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.664	WIND SPEED (Meter/Sec) 11.64	DEW POINT (Celsius) 9.26	TEMP. STRUC. (Kelvin-2/3) NO DATA	BAR. PRES. (Millibar) 1011.51	BULK WT TEMP (Celsius) 13.819	AIR-WT TEMP (Kelvin) -1.215	POT-WT TEMP (Kelvin) -1.117	VIR-WT TEMP (Kelvin) 0.036	V.POT-WT TEMP (Kelvin) 0.134
HEIGHT (Meters) 10.33	POT. TEMP. (Celsius) 12.702	VIR. TEMP. (Celsius) 13.855	V. POT. TEMP. (Celsius) 13.953	ABS. HUMID (Kg/m3) 8.033E-03	REL. HUMID. (Percent) 80.05	SPEL. HUMID. (Kg/Kg) 7.190E-03	VAP. PRES. (Millibars) 11.655	S.VAP. PRES. (Millibars) 14.561	REF. INDEX (Kelvin-2/3) NO DATA

# \* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIER ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY (VARIANCE)	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.024 AT GHH	MOMENTUM FLUX (N/m2) -2.32E-01	FRICTION VELOCITY (Meters/sec) 4.350E-01	WITH LONG. VELOCITY (meter2/sec2) -1.872E-01	AIR DENSITY (Kg/m3) 1.2278
LOG-PERITIC MEAN HEIGHT (Meter) GHH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.851E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.727E-05	AIR SPECIFIC HEAT (J/cal /Kg Kel) 2.415E-02
Z/L AT GHH -0.030	LAT. HEAT FLUX (Watts/m2) 1.17E-02	SCALING POT. TEMP. (Kelvin) 3.267E-02	WITH POT. TEMPERATURE (Meter Kel/sec) 1.395E-02	WATER LAT. HEAT VAP. (J/cal /Kg) 5.901E-05
Z/L AT 10 METERS -0.023	SEN. HEAT FLUX (Watts/m2) 1.73E-01	ROUGHNESS LENGTH (Meters) 2.995E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.781
MONIN-ORONHOV LENGTH (Meters) -4.303E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 0.30E-02	DRAW COEF. AT 10 METERS (Dimensionless) 1.398E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.192E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.04E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.71
	BOWEN RATIO (no units) 0.148			

# \* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE NOT TO BE USED FOR DESIGN PURPOSES.

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
81%	113%	80%	15%	59%	5%	16%	216%	44%	107%	15%	64%	85%
17%	17%	46%	41%	103%	5%	7%	144%	23%	64%	17%	44%	40%

# \* CONTINUED BELOW

RUN NUMBER: 7905091400  
 START TIME: 14: 3:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICRO. ELECTROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

# \* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWEST LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN P. 1:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.019 (0.01) AT GHH	MOMENTUM FLUX (N/m2) -2.22E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.249E-01 (6.0E-02)
LOG-PERITIC MEAN HEIGHT (Meter) GHH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.15E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.15E-05 (3.3E-05)
Z/L AT GHH -0.027 (0.004)	LAT. HEAT FLUX (Watts/m2) 1.04E-02 (2.0E-03)	SCALING POT. TEMP. (Kelvin) 5.065E-02 (0.0E-02)
Z/L AT 10 METERS -0.021 (0.002)	SEN. HEAT FLUX (Watts/m2) 1.23E-01 (3.3E-02)	ROUGHNESS LENGTH (Meters) 2.730E-04 (6.0E-05)
MONIN-ORONHOV LENGTH (Meters) -4.767E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 0.30E-02 (2.0E-03)	DRAW COEF. AT 10 METERS (Meters) 1.324E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.45E-02 (3.3E-03)	
	BOWEN RATIO (no units) 0.135 (0.004)	

# \* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS FORMED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER RESULTS VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE NOT TO BE USED FOR DESIGN PURPOSES.

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SPEL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
169%	177%	7%	5%	197%	8%	7%	267%	4%	32%	117%	17%	7%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905051431  
START TIME: 14:34: 0 PST  
END TIME: 15: 4:10 PST  
START DATE: 9 May 1979 (DAY 127)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6760  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VALUES)

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
VOLT. REF. A	TEMP. STRUCT	TEMP. STRUCT	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	BAR. PRES. 2	WIND DIR
6.265	6.881	6.881	4.946	5.026	6.777	6.935	4.694	5.519	4.961
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19
BULK WT. TEMP	AIR FREQUENCY	AIR VOLTAGE	MANUAL FLAG	ZIRK REF.	SPACE A	SPACE B	VOLT. REF. B	SPACE C	SPACE D
4.131	5.776	0.541	0.001	0.001	0.001	0.001	6.795	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE VALUES)

## \* ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

NO. 1	NO. 2	UPWIND NEAR	UPWIND FARD	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)	HEIGHT/LENGTH PATH (METERS)
1411.126879	1411.126840	0.183	1.00	-0.008	-0.003	-0.003	-0.003	-0.003	-0.003

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSFERRED INTO ENGINEERING UNITS

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DEV. (VOLTS)	REF. FREQ. (KHz)	REF. VOLT. (VOLTS)	REF. FREQ. (KHz)	REF. VOLT. (VOLTS)	REF. FREQ. (KHz)	REF. VOLT. (VOLTS)
0	0	1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS INCLUDING THE ABOVE COR. AND ESCAPEMENT CORRECTIONS TRANSFERRED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY PAV	BULK WT. TEMP	AIR TEMP. 2	WIND SPEED 2
12.688	13.03	9.22	NO DATA	314.3	1011.33	1011.33	13.018	12.644	13.03

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	FILE TABLE	BAR. PRES. 2
12.644	11.96	9.33	NO DATA	-0.46	1011.33

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
14.35	12.059	13.935	14.116	8.804E-03	79.43	7.180E-03	11.614	14.602	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
9.73	12.734	13.931	14.091	8.800E-03	80.93	7.174E-03	11.711	14.596	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905091431  
START TIME: 14:34: 6 PST  
START DATE: 9 May 1979 (DAY 127)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6760  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRISNICK, 1973)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRASS, RICHARDSON NUMBER (1-Table 1, 2-Table 2) 0.036	MOMENTUM FLUX (m <sup>2</sup> /s <sup>2</sup> ) -0.85E-01	FRICITION VELOCITY (meters/sec) 4.826E-01	GENERAL FORM: DN/DZ (N1-N2)/(Z1-Z2) (Z1-Z2) <sup>1/2</sup>	GENERAL FORM: N SLOPE (N1-N2)/(Z1-Z2) (Z1-Z2) <sup>1/2</sup>
GEOMETRIC MEAN HEIGHT (Meters) GM (Z1+Z2)/2 12.77	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 2.70E-05	SCALING: SPEC. HUMID. (kg/kg) -4.560E-05	N-WIND SPEED (m/sec) Z-HEIGHT (M) Vert. Axis DSH/DZ = 1.19E-01	N-WIND SPEED (m/sec) Z-HEIGHT (M) Vert. Axis PS1-PS11 WS SLOPE = 8.29E-01
Z/L AT GRH 0.050	NET HEAT FLUX (Watts/m <sup>2</sup> ) 6.67E-01	SCALING: POT. TEMP. (Kelvin) 7.602E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis DSH/DZ = -8.90E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PS1-PS12 SH SLOPE = -1.19E-04
Z/L AT 10 METERS 0.344	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 4.55E-01	ROUGHNESS LENGTH (Meters) 4.270E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DSH/DZ = 1.49E-02	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1-PS12 PTK SLOPE = 7.11E-00
Z/L AT Z1 3.031	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 7.70E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.570E-03		N-TEMP. STRUCT. (K/M 2/3) Z-HEIGHT (M) Vert. Axis PS1-NONE CTR SLOPE=NO DATA
Z/L AT Z2 0.041	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -7.49E-02			
COULIN DRAG COEFF. LENGTH (Meters) 1.253E-02	ROSEN RATIO (No Units) -0.682			
PS11 AT Z1 = 0.392833 PS11 AT Z2 = 0.191930 PS12 AT Z1 = 0.517342 PS12 AT Z2 = 0.259376				

## \* GENERAL CONSTANTS

VON KARMAN CONSTANT (No Units) 0.4	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.7959	PROFILE TUN. PRANDTL NUMBER 0.74	PROFILE TUN. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 6.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- 0.001 3 kg/kg.

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2267

AIR SPECIFIC HEAT  
(J/cal./kg. Kel.)  
2.415E-02

WATER LAT. HEAT CAP.  
(J/cal./kg.)  
5.9015E-05



RUN NUMBER: 7905091430  
 START TIME: 14:34: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m <sup>2</sup> /3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
12.649	12.09	9.32	NO DATA	1011.23	13.818	-1.169	-1.671	6.007	6.185

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	AHS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m <sup>2</sup> /3)
10.00	12.747	13.905	14.003	3.070E-03	80.13	2.227E-03	11.649	14.630	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.020 AT 6MH	MOMENTUM FLUX (Nt/m2) -2.56E-01	FRICTION VELOCITY (Meter/sec) 4.570E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec2) -2.088E-01	AIR DENSITY (Kg/m3) 1.222
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.86E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.660E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.857E-05	AIR SPECIFIC HEAT (Jcal./Kg) 2.415E+02
Z/L AT 6MH -0.026	LAT. HEAT FLUX (Watts/m2) 1.20E-02	SCALING POT. TEMP. (Kelvin) -3.045E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.351E-02	WATER LAT. HEAT VAP. (Jcal./Kg Kel.) 5.916E+05
Z/L AT 10 METERS -0.020	SEN. HEAT FLUX (Watts/m2) 1.73E-01	ROUGHNESS LENGTH (Meter) 3.546E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.772
MONIN-OBUKHOV LENGTH (Meters) -5.063E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.70E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.428E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.191E-04
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.32E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.43
	BOWEN RATIO (no units) 0.144			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT UNCERTAINTIES  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "per %"

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
72%	98%	78%	145%	51%	5%	12%	197%	39%	106%	12%	59%	78%
177%	177%	46%	41%	105%	5%	7%	146%	21%	64%	104%	44%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091430  
 START TIME: 14:34: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT UNCERTAINTIES  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.020 [0.02] AT 6MH	MOMENTUM FLUX (Nt/m2) -2.67E-01 [6.0E-02]	FRICTION VELOCITY (Meter/sec) 4.665E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.31E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.117E-05 [3.0E-05]
Z/L AT 6MH 0.028 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.08E-02 [2.0E+01]	SCALING POT. TEMP. (Kelvin) 6.667E-02 [2.0E-02]
Z/L AT 10 METERS 0.021 [0.02]	SEN. HEAT FLUX (Watts/m2) 2.49E-01 [3.1E+06]	ROUGHNESS LENGTH (Meter) 3.851E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) 4.659E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -7.70E-02 [2.0E+01]	DRAW COEFF. AT 10 METERS (Meters) 1.429E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -6.76E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.208 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "per %"

GRAD. RICH. NO. AT 6MH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
153%	156%	6%	28%	134%	0%	9%	201%	3%	30%	163%	16%	5%

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

RUN NUMBER: 7965EY1006  
 START TIME: 05:42:20 PM  
 END TIME: 10:34:56 PM  
 FILE DATE: 9 May 1977 (DAY 172)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
SIDE WIND DIR.	TORQUE REF. H	DPM POINT1	DPM POINT2	WIND SPEED1	WIND SPEED2	BAR PRES. 2	SKY RAD.	WIND DIR.
0.001	0.001	5.000	4.921	6.432	6.139	4.690	4.897	5.033
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	
PRESSURE TEMP	AIR FREQ. COEF	VOL. TARG	MANTLE FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B	
0.000	0.000	2.043	0.001	0.001	0.001	0.001	0.005	

NO.	DATE	UPWIND NEAR	UPWIND LAND	UPWIND OFFSHORE	DOWNWIND OFFSHORE	WINDSPEED	WINDDIRECTION	WINDSPEED	WINDDIRECTION
NO.	DATE	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)	(Coeff.)
1	1/1/71	1.0	1.0	0.000	0.000	0.000	0.992	0.992	0.992

AC VOLTAGE	AC FREQUENCY	AC VOLTAGE	AC FREQUENCY	AC VOLTAGE	AC FREQUENCY
115.0 V	59.75 Hz	115.0 V	59.75 Hz	115.0 V	59.75 Hz

WIND DIR. (deg True)	BAR PRES. 1 (Millibar)	SKY RAD. (Watt/m2)	BULK WT TEMP (Celsius)	MEAN AIR TEMP (Kelvin)
316.1	1010.17	-6.83E 02	13.884	285.904

Parameter	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value										
V.POT.TEMP.1	(Celsius)	14.196	AHS.HUMID.1	(Kg/m <sup>3</sup> )	70.15	RFL.HUMID.1	(Percent)	70.15	SPEC.HUMID.1	(Kg/Kg)	7.149E-03	VAP.PRES.1	(Millibar)	11.496	S.VAP.PRES.1	(Millibar)	14.716	REF.INDEX.1	(kel.xm-2/3)	No DATA
V.POT.TEMP.2	(Celsius)	14.942	AHS.HUMID.2	(Kg/m <sup>3</sup> )	72.09	RFL.HUMID.2	(Percent)	72.09	SPEC.HUMID.2	(Kg/Kg)	7.160E-03	VAP.PRES.2	(Millibar)	11.591	S.VAP.PRES.2	(Millibar)	14.856	REF.INDEX.2	(kel.xm-2/3)	No DATA

ROW NUMBER: 7905091000  
START TIME: 15: 4:20 UT  
START DATE: 9 May 19 7 (DAY 129)

MARTINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CALIF

PRINT DATE: 11 JUN 1981  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2=LOWER LEVEL

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
CRAGG-SHARPLEY NUMBER (+stable, - unstable) 0.055                      At GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.68E-01	FRICTION VELOCITY (meters/sec) 3.704E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/1/Ln(Z1/Z2)* (Z1KZ2)/Z1	GENERAL FORM: (N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/[(N1-N2)
GEOMETRIC MEAN HEIGHT (center) GMM=(Z1+Z2)/2 1.199	HUMIDITY FLUX (kg/sec. m <sup>2</sup> ) 1.15E-05	LOADING SPEC. HUND. (kg/kg) 3.807E-05	N-WIND SPEED (M/sec) Z=HEIGHT (Meters) DN5/DZ = 1.05E-01	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.0HE 00
Z/L At GMM 0.101	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.17E-01	SCALING POT. TEMP. (Kelvin) 2.747E-02	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -1.40E 04
Z/L At 10 METERS 0.152	SIN. HEAT FLUX (Watts/m <sup>2</sup> ) -3.56E-01	ROUGHNESS LENGTH (Meters) 1.711E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 1.01E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 6.9HE 00
Z/L At Z1 0.141	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 6.83E-02	DRAK COEF. AT 10 METERS (Dimensionless) 1.039E-03		N=LnTEMP. STRUC. (KxM-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L At Z2 0.171	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -6.76E-02			
ROUGHNESS LENGTH (Meters) 1.305E-02	ROBINN RATIO (no units) 0.033			
PSI1 At Z1 = 0.668944				
PSI1 At Z2 = 0.131420				
PSI2 At Z1 = 0.993167				
PSI2 At Z2 = 0.441030				

GEN. PARAM. CONSTANT	GRAVITATION ACCELERATION (CM/SEC. <sup>2</sup> )	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.00010	9.2932	0.74	0.74	0.921-03	1.324-03

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2264

Accuracy Limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation exceeded by insertion of:

$$500 \text{ g H}_2\text{O} : 0.7 \text{ g OH} = 3 \text{ Kg/Kg.}$$

AIR SPECIFIC HEAT  
(J/cal./kg Kel.)  
1.4154E 02

WATER LAT. HEAT VAP.  
(11 Cal./Kg)  
5.9011E 05

RUN NUMBER: 7905091508  
 START TIME: 15: 4:20 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.716	11.54	9.17	NO DATA	1011.17	13.864	-1.088	-0.990	0.155	0.253

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ARS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.814	13.959	14.057	8.777E-03	78.98	7.154E-03	11.580	14.663	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 AT 10M	MOMENTUM FLUX (Nt/m2) -2.27E-01	FRICTION VELOCITY (Meters/sec) 4.304E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.832E-01	AIR DENSITY (Kg/m3) 1.2269
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.75E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.008E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.757E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4155E 02
Z/L AT GMH -0.023	LAT. HEAT FLUX (Watts/m2) 1.18E 02	SCALING POT. TEMP. (Kelvin) -2.906E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.251E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9012E 03
Z/L AT 10 METERS -0.022	SEN. HEAT FLUX (Watts/m2) 1.55E 01	ROUGHNESS LENGTH (Meters) 2.886E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.761
MONIN OBUKHOV LENGTH (Meters) -4.651E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -6.83E 02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.392E-03		ARS. HUMID. AT WT LEVEL (Kg/m3) 1.190E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.50E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.37
	BOWEN RATIO (no units) 0.132			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-%":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
75%	110%	80%	153%	58%	5%	10%	211%	44%	109%	14%	64%	88%
181%	181%	46%	41%	109%	5%	8%	149%	23%	64%	132%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091508  
 START TIME: 15: 4:20 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.633 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.07E 01 (4.0E 02)	FRICTION VELOCITY (Meter/sec) 4.098E 01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.12E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.084E-05 (3.0E-05)
Z/L AT GMH -0.149 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.02E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 6.741E-02 (2.0E-02)
Z/L AT 10 METERS -0.030 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.79E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.414E-04 (6.0E-05)
MONIN OBUKHOV LENGTH (Meters) -2.056E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 6.83E 02 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 1.282E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.04E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.268 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-%":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
1.0%	150%	1%	4%	150%	0%	11%	102%	8%	38%	102%	25%	15%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091530  
START TIME: 15:34:40 PST  
END TIME: 16:44:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE UDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRESS. 1	REF. BAR. 1	REF. BAR. 2
0.205	0.001	0.011	4.875	4.957	5.107	5.910	4.091	4.170	4.170
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	MANUAL FLAG	ZTRD. REF.	SOURCE A	SOURCE B	VOLT. REF. B	VOLT. REF. C	VOLT. REF. D
4.145	5.743	2.542	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTION

No. 1	No. 2	UPWIND NEAR	UPWIND FARGO	DIFF. TALL	DIFF. TALL	DIFF. TALL	DIFF. TALL	DIFF. TALL	DIFF. TALL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATHLENGTH	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 129004	1421 128093	0.183	121	9.388	-0.050	0.000	0.000	0.000	0.000

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DEVI.	VOLT. REF. DEVI.	ZERO REF. DEVI.	AC. VOLT. FREQ.	AC. VOLT. FREQ.	AC. VOLT. FREQ.	AC. VOLT. FREQ.
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE DATA AND ESCARPMENT CORRECTION) 1-UPPER LEVEL DATA, 2-LOWER LEVEL DATA

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRESS. 1	REF. BAR. 1	BULK WT. TEMP.	AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE RANGE	BAR. PRESS. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Deg. True)	(Millibar)	(Millibar)	(Celsius)	(Celsius)	(Meter/sec)	(Celsius)	(Kelvin 2/3)	(Meter MSL)	(Millibar)
12.930	11.90	8.80	NO DATA	314.8	1714.10	5.06100	15.783	12.869	11.01	8.92	NO DATA	-0.17	1011.28

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Kelvin 2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
14.35	13.080	14.114	14.294	8.550E-03	76.13	6.979E-03	11.237	14.826	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Kelvin 2/3)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin 2/3)
9.20	12.899	14.033	14.123	8.637E-03	77.22	7.037E-03	11.493	14.954	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091530  
START TIME: 15:34:40 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.069 AT GMH	MOMENTUM FLUX (Nt/m2) -1.22E-01	FRICTION VELOCITY (meters/sec) 3.156E-01	GENERAL FORM DN/DZ = (N1-N2)/[ln(Z1/Z2)] * (Z1*Z2)/Z1	GENERAL FORM: N1'SLOPE = [ln(Z1-PSI)-ln(Z2-PSI)]/Z1 (N1-N2)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 1.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -3.354E-05	N-WIND SPEED (m/sec) Z-HEIGHT (Meters) DSH/DZ = 9.97E-02	N-WIND SPEED (m/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 1.27E-00
Z/L AT GMH 0.134	LAT. HEAT FLUX (Watts/m2) 3.21E-01	SCALING POT. TEMP. (Kelvin) 7.577E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 1.61E-04
Z/L AT 10 METERS 0.103	SEN. HEAT FLUX (Watts/m2) -2.96E-01	ROUGHNESS LENGTH (Meters) 9.673E-05	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = 2.01E-02	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = 7.14E-00
Z/L AT Z1 0.109	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.82E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 0.198E-04	N=LN(TEMP. STRUCT. (K/M 2/3)) Z-HEIGHT (M) Vert. Axis PSI=NONE	CT2 SLOPE=NO DATA
Z/L AT Z2 0.095	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.79E-02			
ROMEN DEBUKHOV LENGTH (Meters) 9.703E-01	ROMEN RATIO (no units) -0.925			
PSI1 AT Z1 = -0.083840 PSI1 AT Z2 = -0.445631 PSI2 AT Z1 = -1.201135 PSI2 AT Z2 = -0.602204				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUR. PRANDTL NUMBER 0.74	PROFILE TUR. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY (Kg/m3) 1.2260
AIR SPECIFIC HEAT (J/Kal./Kg. Kel.) 2.410E-02
WATER LAT. HEAT CAP (J/Kal./Kg.) 5.9084E-02

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- .008E-3 Kg/Kg.

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905091530  
 START TIME: 15:34:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V. POT-WT TEMP. (Kelvin)
12.820	11.12	8.91	NO DATA	1011.18	13.783	-0.963	-0.865	0.254	0.327

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.918	14.043	14.141	8.673E-03	77.08	7.030E-03	11.380	14.764	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.022 AT 10M	MOMENTUM FLUX (Nt/m2) -2.07E-01	FRICTION VELOCITY (Meters/sec) 4.105E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.685E-01	AIR DENSITY (Kg/m3) 1.2266
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.79E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.510E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.760E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4150E-02
Z/L AT 10M -0.028	LAT. HEAT FLUX (Watts/m2) 1.18E-02	SCALING POT. TEMP. (Kelvin) -2.642E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.085E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9086E-05
Z/L AT 10 METERS -0.021	SEN. HEAT FLUX (Watts/m2) 1.35E-01	ROUGHNESS LENGTH (Meters) 2.450E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.740
MONTIN-OBUKHOV LENGTH (Meters) -4.655E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.82E-02	DRAG COEFF. AT 10 METERS (Dimensionless) 1.364E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.189E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -4.50E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.38
	BOWEN RATIO (no units) 0.114			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-%".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
76%	129%	93%	157%	62%	5%	10%	219%	47%	11%	15%	67%	93%
188%	108%	46%	40%	116%	5%	8%	156%	73%	63%	139%	45%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091530  
 START TIME: 15:34:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS IS. AND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.043 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -1.79E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 3.791E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.00E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.27E-05 [3.0E-05]
Z/L AT 10M 0.068 [0.02]	LAT. HEAT FLUX (Watts/m2) 1.91E-02 [2.0E-01]	SCALING POT. TEMP. (Kelvin) 6.571E-02 [2.0E-02]
Z/L AT 10 METERS 0.032 [0.02]	SEN. HEAT FLUX (Watts/m2) -1.47E-01 [3.0E-01]	ROUGHNESS LENGTH (Meters) 1.85E-04 [6.0E-05]
MONTIN-OBUKHOV LENGTH (Meters) 1.908E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) -5.82E-02 [2.0E-01]	DRAG COEFF. AT 10 METERS (Dimensionless) 1.200E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) -5.07E-02 [3.0E-01]	
	BOWEN RATIO (no units) 0.318 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-%".

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEFF.
116%	121%	25%	0%	154%	0%	13%	165%	13%	44%	100%	41%	14%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* ATMOSPHEROLOGICAL DATA \*\*\*

RAW NUMBER: 7905091600  
START TIME: 16:45:00 PST  
DATE: 12 May 1979 (DAY 129)  
STOP TIME: 17:00:00 DAY 129

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NUMFIATUURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 01	TEMP. STRUC. 1	No. 02	TEMP. STRUC. 2	No. 03	DEW POINT 1	No. 04	DEW POINT 2	No. 05	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 06	WIND SPEED 2	No. 07	BAR. PRES. 2	No. 08	SKY RAD.	No. 09	WIND DIR.	No. 10	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 11	TEMP. STRUC. 1	No. 12	TEMP. STRUC. 2	No. 13	DEW POINT 1	No. 14	DEW POINT 2	No. 15	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 16	WIND SPEED 2	No. 17	BAR. PRES. 2	No. 18	SKY RAD.	No. 19	WIND DIR.	No. 20	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

## ESCARPMENT DATA, FIELD IRRADIATION AND WIND SPEED ESCARPMENT CORRECTIONS:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 21	TEMP. STRUC. 1	No. 22	TEMP. STRUC. 2	No. 23	DEW POINT 1	No. 24	DEW POINT 2	No. 25	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 26	WIND SPEED 2	No. 27	BAR. PRES. 2	No. 28	SKY RAD.	No. 29	WIND DIR.	No. 30	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 31	TEMP. STRUC. 1	No. 32	TEMP. STRUC. 2	No. 33	DEW POINT 1	No. 34	DEW POINT 2	No. 35	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 36	WIND SPEED 2	No. 37	BAR. PRES. 2	No. 38	SKY RAD.	No. 39	WIND DIR.	No. 40	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 41	TEMP. STRUC. 1	No. 42	TEMP. STRUC. 2	No. 43	DEW POINT 1	No. 44	DEW POINT 2	No. 45	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 46	WIND SPEED 2	No. 47	BAR. PRES. 2	No. 48	SKY RAD.	No. 49	WIND DIR.	No. 50	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 51	TEMP. STRUC. 1	No. 52	TEMP. STRUC. 2	No. 53	DEW POINT 1	No. 54	DEW POINT 2	No. 55	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 56	WIND SPEED 2	No. 57	BAR. PRES. 2	No. 58	SKY RAD.	No. 59	WIND DIR.	No. 60	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

A CONTINUED ON NEXT PAGE

RAW NUMBER: 7905091600  
START TIME: 16:45:00 PST  
DATE: 12 May 1979 (DAY 129)  
STOP TIME: 17:00:00 DAY 129

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
NUMFIATUURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 61	TEMP. STRUC. 1	No. 62	TEMP. STRUC. 2	No. 63	DEW POINT 1	No. 64	DEW POINT 2	No. 65	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 66	WIND SPEED 2	No. 67	BAR. PRES. 2	No. 68	SKY RAD.	No. 69	WIND DIR.	No. 70	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

Channel	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data	Raw Data
No. 71	TEMP. STRUC. 1	No. 72	TEMP. STRUC. 2	No. 73	DEW POINT 1	No. 74	DEW POINT 2	No. 75	WIND SPEED 1
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
No. 76	WIND SPEED 2	No. 77	BAR. PRES. 2	No. 78	SKY RAD.	No. 79	WIND DIR.	No. 80	WIND DIR.
16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73

## RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

RAW DATA CHANNELS: RAW DATA CHANNELS: MDO:

## MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2259

AIR SPECIFIC HEAT  
(ITcal./Kg Kel.)  
2.4151E 02

WATER LAT. HEAT VAP.  
(ITcal./Kg)  
5.9002E 05

RUN NUMBER: 7905091606  
 START TIME: 16: 4:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.055	11.37	8.85	NO DATA	1011.17	13.755	-6.901	-6.863	0.317	0.415

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	AIR HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	10.953	14.073	14.171	8.590E-03	76.63	7.004E-03	11.338	14.797	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.019 AT 6M	MOMENTUM FLUX (N/m2) -2.19E-01	FRICTION VELOCITY (Meters/sec) 4.225E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.785E-01	AIR DENSITY (Kg/m3) 1.2264
BULK RICH. MEAN HEIGHT (Meters) 6M*(21+22)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.92E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.488E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.916E-05	AIR SPECIFIC HEAT (J/Kelvin) 2.4151E 02
Z/L AT 6M -0.005	LAT. HEAT FLUX (Watts/m2) 1.21E 02	SCALING POT. TEMP. (Kelvin) -2.461E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 1.040E-02	WATER LAT. HEAT VAP. (J/Kelvin) 5.9064E 05
Z/L AT 10 METERS -0.019	SUN. HEAT FLUX (Watts/m2) 1.29E 01	ROUGHNESS LENGTH (Meters) 2.707E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.711
MONIN-ORUKHOV LENGTH (Meters) -5.294E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.76E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.390E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.187E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -3.36E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.37
	BOWEN RATIO (no units) 0.106			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE LOW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
78%	135%	97%	160%	64%	5%	11%	225%	48%	112%	16%	68%	97%
19%	19%	46%	40%	120%	5%	9%	161%	23%	63%	143%	43%	40%

\* CONTINUED BOTTOM

RUN NUMBER: 7905091606  
 START TIME: 16: 4:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.047 (15.0%) AT 6M	MOMENTUM FLUX (N/m2) -1.85E-01 (16.0%-02)	FRICTION VELOCITY (Meters/sec) 3.84E-01 (16.0%-02)
BULK RICH. MEAN HEIGHT (Meters) 6M*(21+22)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.17E-05 (16.0%-04)	SCALING SPEC. HUMID. (Kg/Kg) -9.22E-05 (16.0%-05)
Z/L AT 6M -0.026 (14.0%)	LAT. HEAT FLUX (Watts/m2) 1.03E 02 (16.0%-01)	SCALING POT. TEMP. (Kelvin) 6.65E-02 (16.0%-02)
Z/L AT 10 METERS -0.058 (14.0%)	SUN. HEAT FLUX (Watts/m2) 1.42E 01 (16.0%-04)	ROUGHNESS LENGTH (Meters) 1.98E-04 (16.0%-05)
MONIN-ORUKHOV LENGTH (Meters) -1.017E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 4.70E 02 (16.0%-01)	DRAG COEF. AT 10 METERS (Meters) 1.18E-03 (16.0%-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.53E 02 (16.0%-01)	
	BOWEN RATIO (no units) 0.343 (16.0%)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
100%	114%	30%	5%	153%	6%	17%	159%	16%	45%	98%	48%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS DIVISION  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091630  
START TIME: 16:30:00 PST  
END TIME: 17:50:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 3 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## ANALOG CHANNEL RAW DATA (AVERAGE VALUES)

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	TEMP. STRUCT. 3	TEMP. STRUCT. 4	TEMP. STRUCT. 5	TEMP. STRUCT. 6	TEMP. STRUCT. 7	TEMP. STRUCT. 8	TEMP. STRUCT. 9
6.205	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19
BULK WT. TEMP.	WIND SPEED	WIND DIR.	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8
4.058	3.702	2.046	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## DIGITAL CHANNEL RAW DATA (AVERAGE VALUES) ESCAPEMENT DATA, FIELD CALIBRATION AND WIND DIRECTION ESCAPEMENT CORRECTIONS

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9
AIR TEMP. 1	AIR TEMP. 2	WIND SPEED	WIND DIR.	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6
14.1128896	14.1127771	9.103	100	10.000	10.000	10.000	10.000	10.000

## SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS

ANALOG FLAG	COUNT	DATA DATE	VOLT. REF. DIV	VOLT. REF. DIV	ZERO REF. DIV	AC VOLT. DIV	AC FREQ. DIV	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	0	0	0	0	0	0	0	0

## OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND SPEED 1	WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
12.893	12.41	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA

## CALCULATED MICROMETEOROLOGICAL PARAMETERS

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(millibar)	(millibar)	(Celsius)
18.35	13.069	14.119	14.099	0.853E-03	77.19	7.07E-03	11.436	14.016	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091630  
START TIME: 16:30:00 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRISINCK, 1973)

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.084 AT 0M	MOMENTUM FLUX (Nt/m2) -0.51E-02	FRICTION VELOCITY (Meters/sec) 2.635E-01	GENERAL FORM: DN/DZ = [(N1-N2)/T1] * (Z1/Z2)^2	GENERAL FORM: N SLOPE = [(N1-N2)/(Z1-Z2)] * (Z1-N2)
GEOMETRIC MEAN HEIGHT (Meters) GMH = (Z1+Z2)/2 12.77	HUMIDITY FLUX (kg/sec m2) 9.29E-06	SCALING SPEC. HUMID. (kg/kg) -2.874E-03	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 7.50E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 MS SLOPE = 1.52E-00
Z/L AT 0M 0.182	LAT. HEAT FLUX (Watts/m2) 2.27E-01	SCALING POT. TEMP. (Kelvin) 7.190E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 1.83E-04
Z/L AT 10 METERS 0.140	SEN. HEAT FLUX (Watts/m2) -2.35E-01	ROUGHNESS LENGTH (Meters) 4.94E-05	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 2.23E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI3 PTK SLOPE = 7.52E-00
Z/L AT Z2 0.129	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.55E-02	DRAG COEF. AT 10 METERS (Dimensionless) 5.22E-04		N=LATENT STRUCT. (K/m 2/3) Z=HEIGHT (M) Vert. Axis PSI=NON CT2 SLOPE=NO DATA
MUNIN-ORLOKHOF LENGTH (Meters) 7.138E-01	TOTAL HEAT FLUX (Watts/m2) -3.56E-02			
PSI1 AT Z1 = -1.208321 PSI1 AT Z2 = -0.605807 PSI2 AT Z1 = -1.632866 PSI2 AT Z2 = -0.811658	ROMEN RATIO (no units) -1.024			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec 2)	PROFILE TUR. PRANDTL NUMBER	PROFILE TUR. SCHMIDT NUMBER	BULK SEN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7939	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m3)  
1.2260

AIR SPECIFIC HEAT  
(J/cal./Kg Kell.)  
2.4153E-02

WATER LAT. HEAT VAP.  
(J/cal./Kg)  
5.9006E-05

\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905091630  
 START TIME: 16:35: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	WV-WT TEMP. (Kelvin)	REF-WT TEMP. (Kelvin)
12.792	11.66	9.07	NO DATA	1011.17	13.739	-0.946	0.845	0.224	0.000

HEIGHT (Meters)	POT. TEMP. (Celsius)	WV. TEMP. (Celsius)	U. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. TEMP. (Kelvin-M/2/3)
10.00	12.890	14.028	14.126	8.710E-03	78.07	7.103E-03	11.556	14.737	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+/-Stable, -Unstable) -0.019 AT GNH	MOMENTUM FLUX (Nt/m2) -2.34E-01	FRICTION VELOCITY (Meters/sec) 4.363E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.904E-01	AIR DENSITY (Kg/m3) 1.2265
GEOMETRIC MEAN HEIGHT (Meter) GNH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.83E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.016E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.825E-05	AIR SPECIFIC HEAT (Jcal./Kg kel.) 2.4104E 02
Z/L AT GNH -0.024	LAT. HEAT FLUX (Watts/m2) 1.19E 02	SCALING POT. TEMP. (Kelvin) -2.543E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.110E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9008E 05
Z/L AT 10 METERS -0.018	SEN. HEAT FLUX (Watts/m2) 1.38E 01	ROUGHNESS LENGTH (Meters) 3.026E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.694
MONIN-OBUKHOV LENGTH (Meters) -5.464E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.55E 02	DRAG COEF. AT 10 METERS (Dimensionless) 1.400E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.185E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.22E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.37
	BOWEN RATIO (no units) 0.115			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GNH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
83%	153%	108%	169%	73%	5%	11%	241%	54%	115%	19%	74%	108%
189%	189%	46%	41%	117%	5%	11%	158%	24%	64%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091630  
 START TIME: 16:35: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 1/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+/-Stable, -Unstable) 0.053 (0.02) AT GNH	MOMENTUM FLUX (Nt/m2) -1.89E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 3.847E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GNH=(Z1*Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.07E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 6.820E-05 (3.0E-05)
Z/L AT GNH 0.090 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.00E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 6.650E-02 (2.0E-02)
Z/L AT 10 METERS 0.069 (0.02)	SEN. HEAT FLUX (Watts/m2) -9.23E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.095E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.442E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -3.55E 02 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.187E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) -2.81E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.335 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATIONS FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER APPLICABLE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GNH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
104%	115%	42%	56%	207%	0%	23%	174%	74%	4%	103%	61%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGY: OPTICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

EXP. NUMBER: 299509/1700  
START TIME: 17:50:00 PST  
END TIME: 17:50:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 25 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* CHANNEL CHANNELS: RAW DATA (UNCORRECTED):

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

## \* CHANNEL CHANNELS: RAW DATA (UNCORRECTED):

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

## \* CHANNEL CHANNELS: RAW DATA (UNCORRECTED): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

## \* CHANNEL CHANNELS: RAW DATA (UNCORRECTED): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS: TRANSLATED INTO ENGINEERING UNITS:

NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

## \* CONTINUED BELOW

EXP. NUMBER: 299509/1700  
START TIME: 17:50:00 PST  
END TIME: 17:50:00 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 25 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
QUADRIC RICHARDSON NUMBER (C <sub>1</sub> Stable, -C <sub>2</sub> Unstable) 0.066	MOMENTUM FLUX (Nt/m <sup>2</sup> ) 1.40E-01	FRICITION VELOCITY (meters/sec) 3.375E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/1/(N1-Z1/72)* (Z1*Z2)/1/21	GENERAL FORM: N SLOPE = 1/(N1-PS1)-(N2-PS1)/1/ [N1-N2]
GEOMETRIC MEAN HEIGHT (meters) GMH=(Z1+Z2)/2 10.97	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 1.43E-05	SCALING SPEC. HUMID. (kg/kg) -3.451E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DWS/DZ = 1.04E-31	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 1.19E-00
GMH AT 10 M 0.126	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.54E-01	SCALING POT. TEMP. (Kelvin) 8.135E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -1.57E-04
Z/L AT 10 METERS 0.097	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -3.40E-01	ROUGHNESS LENGTH (Meters) 1.230E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = 2.10E-02	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 6.44E-00
Z/L AT Z1 0.174	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 2.51E-02	DRAW COEF. AT 10 METERS (Dimensionless) 8.697E-04		N=LNTMP. STRUC. (km-2/3) Z=HEIGHT (M) Vert. Axis PS1=NONE CTP SLOPE=NO DATA
Z/L AT Z2 0.087	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -2.50E-02			
DOWN DRAG LENGTH (Meters) 1.035E-02	ROMEN RATIO (no units) -0.965			
PS11 AT Z1 = 0.035001 PS11 AT Z2 = -0.418628 PS12 AT Z1 = 1.120488 PS12 AT Z2 = 0.565781				

## \* GENERAL CONSTANTS:

GRAVITATION	PROF. TUR. PRANDTL	PROF. TUR. SCHMIDT	BULK SP. HEAT	BULK MOISTURE
9.80665	0.74	0.74	0.921-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY	AIR SPECIFIC HEAT	WATER LAT. HEAT VAP.
1.2260	2.415E-02	5.9006E-05

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

WIND DIR. 1 = 0.0E 3 Kg/Kg.

RUN NUMBER: 2205851700  
 START TIME: 17: 5: 19.00  
 START DATE: 8 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 75 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.794	WIND SPEED (Meters/sec) 11.50	DEW POINT (Celsius) 9.26	TEMP. STRUC. (Kelvin-M/2/3) NO DATA	BAR. PRES. (Millibar) 1011.16	BULK WT TEMP (Celsius) 13.713	AIR-WT TEMP (Kelvin) -0.922	POT-WT TEMP (Kelvin) -0.824	VIR-WT TEMP (Kelvin) 0.325	V.POT-WT TEMP (Kelvin) 0.423
W. BAIL (meters) 19.00	POT. TEMP. (Celsius) 14.089	VIR. TEMP. (Celsius) 14.038	V.POT. TEMP. (Celsius) 14.136	ABS. HUMID. (Kg/m3) 8.777E-03	REL. HUMID. (Percent) 78.78	SPEC. HUMID. (Kg/Kg) 7.172E-03	VAP. PRES. (Millibars) 11.689	S. VAP. PRES. (Millibars) 14.735	REF. INDEX (Kelvin-M/2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
BRAD. RICHARDSON NUMBER (Stability, -Unstable) 0.619 AT GMM	MOMENTUM FLUX (Nt/m2) -2.25E-01	FRICTION VELOCITY (Meters/sec) 4.286E-01	WITH LOG. VELOCITY (Meter/sec2) -1.877E-01	AIR DENSITY (Kg/m3) 1.2266
LOG. BULK DEW HEIGHT (meter) GMM-(Z1+Z2)/2 10.99	HUMIDITY FLUX (Kg/sec m2) 4.61E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.771E-05	WITH ABS. HUMIDITY (Meter kg/sec m3) 4.611E-05	AIR SPECIFIC HEAT (Jcal./kg Kel.) 2.4155E 02
Z/L AT GMM -0.024	LAT. HEAT FLUX (Watts/m2) 1.14E 02	SCALING POT. TEMP. (Kelvin) -2.506E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.071E-02	WATER LAT. HEAT VAP. (Jcal./kg) 5.9088E 05
Z/L AT 10 METERS -0.019	SEN. HEAT FLUX (Watts/m2) 1.33E 01	ROUGHNESS LENGTH (meters) 2.845E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.668
MONIN-OBUKHOV LENGTH (meters) -0.363E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -2.51E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.389E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.183E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.24E 02			BAR. PRES. AT WT LEVEL (Millibar) 1012.36
	BOWEN RATIO (no units) 0.117			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PARENT ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "worst":

BRAD. RICH. NO. AT GMM	Z/L AT 10M	MOM. FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
25%	10%	9%	15%	6%	5%	19%	21%	4%	11%	14%	6%	9%
19%	19%	4%	4%	11%	5%	14%	16%	3%	6%	14%	4%	4%

\* CONTINUE BELOW

RUN NUMBER: 2205851701  
 START TIME: 17: 5: 19.00  
 START DATE: 8 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 75 min

\* STANDARD DEVIATION AND BULK AERODYNAMIC DERIVED PARAMETER VALUE LISTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOW LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
BRAD. RICHARDSON NUMBER (Stability, -Unstable) 0.619 AT GMM AT 10M	MOMENTUM FLUX (Nt/m2) 1.97E 01 16.0E 02	FRICTION VELOCITY (Meter/sec) 3.90E 01 16.0E 02
LOG. BULK DEW HEIGHT (meter) GMM-(Z1+Z2)/2 10.99	HUMIDITY FLUX (Kg/sec m2) 4.61E 05 13.0E 06	SCALING SPEC. HUMID. (Kg/Kg) 8.61E 05 13.0E 05
Z/L AT GMM -0.024	LAT. HEAT FLUX (Watts/m2) 9.75E 01 12.0E 02	SCALING POT. TEMP. (Kelvin) 2.50E 02 12.0E 02
Z/L AT 10 METERS -0.019	SEN. HEAT FLUX (Watts/m2) 1.34E 01 13.0E 01	ROUGHNESS LENGTH (meters) 2.80E 04 16.0E 05
MONIN-OBUKHOV LENGTH (meters) -0.363E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 2.51E 02 12.0E 01	DRAW COEF. AT 10 METERS (meter) 1.43E 03 14.0E 04
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.22E 02 13.0E 01	
	BOWEN RATIO (no units) 0.343 10.00	

\* STANDARD DEVIATION OF PARENT AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE LOW OR HIGH LIMIT OF THE MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ARGOUT VALUE IS LARGER). ALL VALUES ARE

BRAD. RICH. NO. AT GMM	Z/L AT 10M	MOM. FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
10%	10%	9%	4%	13%	5%	36%	15%	12%	4%	9%	3%	3%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905071730  
START TIME: 17:30:30 PST  
END TIME: 18:04:00 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 0.1 HMM (1000 Hz) / 1000 Hz  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE MODE):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	WIND PRESS. 1	WIND PRESS. 2	WIND DIR
6.205	0.001	0.001	4.000	4.000	8.000	8.000	10.000	10.000	0.000
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	2000 REF	SHARP A	SHARP B	SHARP C	SHARP D	SHARP E
4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ENCUMBRMENT DATA, FIELD OR LOCATION AND WIND SPEED ENCUMBRMENT CORRECTIONS

No. 1	No. 2	ENCUMBRMENT DATA	FIELD OR LOCATION	WIND SPEED ENCUMBRMENT CORRECTIONS
AIR TEMP. 1	AIR TEMP. 2	ENCUMBRMENT DATA	FIELD OR LOCATION	WIND SPEED ENCUMBRMENT CORRECTIONS
1411 128774	1411 128168	ENCUMBRMENT DATA	FIELD OR LOCATION	WIND SPEED ENCUMBRMENT CORRECTIONS

## \* SYSTEM HOUSEKEEPING PARAMETERS (TRANSLATED INTO ENGINEERING UNITS)

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DIV	VOLT. REF. DIV	2000 REF. DIV	AC FREQUENCY	AC VOLTAGE	AC FREQUENCY	AC VOLTAGE
0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING TOP-AIRINE DATA AND ENCUMBRMENT CORRECTIONS) (TRANSLATED INTO ENGINEERING UNITS)

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAROMETRIC 1	WIND PRESS. 1	BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Degrees)	(Millibar)	(Millibar)	(Celsius)	(Hz)	(Volts)
12.827	13.00	0.00	NO DATA	0.00	1011.15	1011.15	12.827	0.000	0.000
AIR TEMP. 2 <th>WIND SPEED 2</th> <th>DEW POINT 2</th> <th>TEMP. STRUCT. 2</th> <th>WIND DIR</th> <th>BAROMETRIC 2</th> <th>WIND PRESS. 2</th> <th>BULK WT. TEMP.</th> <th>AC FREQUENCY</th> <th>AC VOLTAGE</th>	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR	BAROMETRIC 2	WIND PRESS. 2	BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Degrees)	(Millibar)	(Millibar)	(Celsius)	(Hz)	(Volts)
12.819	11.86	0.00	NO DATA	0.00	1011.20	1011.20	12.819	0.000	0.000

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
18.35	13.057	14.101	14.101	14.101	14.101	14.101	14.101	14.101	14.101
HEIGHT, Z2	POT. TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2	WIND TEMP. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
9.29	12.787	14.091	14.091	14.091	14.091	14.091	14.091	14.091	14.091

## \* CONTINUED BELOW

RUN NUMBER: 7905071730  
START TIME: 17:30:30 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 0.1 HMM (1000 Hz) / 1000 Hz  
DATA AVERAGING PERIOD: 30 MIN  
NOMINATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.031 AT GMM	MOMENTUM FLUX (N/m <sup>2</sup> ) -4.00E-01	FRICITION VELOCITY (Meters/sec) 5.728E-01	GENERAL FORM. DZ/DZ 1.0E-001/1.0E-01/2.0E-01 0.21X2.21/2.0	GENERAL FORM. DZ/DZ 1.0E-001/1.0E-01/2.0E-01 0.21X2.21/2.0
GEOMETRIC MEAN HEIGHT (Meters) GMM-(Z1+Z2)/2 12.77	HUMIDITY FLUX (kg/sec/m <sup>2</sup> ) 3.30E-05	SCALING SPEC. HUMID. (kg/kg) 4.70E-05	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1-PS1 DSH/DZ = 1.30E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1-PS1 WS SLOPE = 6.93E-01
Z/L AT GMM 0.048	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 0.30E-01	SCALING POT. TEMP. (Kelvin) 0.068E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PS1-PS1 DSH/DZ = 8.92E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PS1-PS1 SH SLOPE = 1.15E-04
Z/L AT 10 METERS 0.037	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) -6.30E-01	ROUGHNESS LENGTH (Meters) 7.544E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis DPT/DZ = 1.05E-02	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1-PS1 PTK SLOPE = 6.10E-00
Z/L AT Z1 0.047	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.48E-02	DRAG COEFF. AT 10 METERS (Dimensionless) 7.20E-05		
ROBIN DEKKOU LENGTH (Meters) 2.721E-02	TOTAL HEAT RADIANT FLUX (Watts/m <sup>2</sup> ) -1.26E-02			
PS11 AT Z1 -0.316970 PS11 AT Z2 -0.158927 PS12 AT Z1 -0.428365 PS12 AT Z2 -0.214766	BOWEN RATIO (no units) -0.709			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION (M/sec <sup>2</sup> )	PRANDTL NUMBER	PROFITS NUMBER	BULK TRANF. COEF.	BULK MOISTURE TRANF. COEF.
0.4	9.797	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = 1/2 - SH1 3 Kq/Kq

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2259

AIR SPECIFIC HEAT  
(J/kg K)  
2.415E-02

WATER LAT. HEAT VAP.  
(J/kg K)  
5.905E-01

RUN NUMBER: 7905091730  
 START TIME: 17:30:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STAB. (Celsius/2/3)	BAR. PRES. (millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT. WT TEMP (Kelvin)
12.526	12.01	9.02	NO DATA	1011.10	13.677	-0.851	-0.753	0.381	0.479

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (millibar)	S. VAP. PRES. (millibar)	REF. INDEX (Kelvin-2/3)
10.00	12.224	14.057	14.175	8.687E-03	77.64	7.087E-03	11.465	14.768	NO DATA

\* BULK AERODYNAMIC CALCULATION, BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 At 6M	MOMENTUM FLUX (Nt/m2) -2.52E-01	FRICTION VELOCITY (Meters/sec) 4.529E-01	WITH LONG. VELOCITY (meter2/sec2) -2.051E-01	AIR DENSITY (kg/m3) 1.224
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.95E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.904E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.947E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4153E 02
Z/L AT 6M -0.020	LAT. HEAT FLUX (Watts/m2) 1.221 02	SCALING POT. TEMP. (Kelvin) -2.278E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.032E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9066E 05
Z/L AT 10 METERS -0.015	SEN. HEAT FLUX (Watts m2) 1.28E 01	ROUGHNESS LENGTH (Meters) 3.439E-04		VAP. PRES. AT WT LEVEL (millibar) 15.630
MONTIN-OBUKHOV LENGTH (Meters) -6.572E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) -1.46E 02	DRAW COEF. AT 10 METERS (Dimensionless) 1.423E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.181E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -1.14E 01			BAR. PRES. AT WT LEVEL (millibar) 1912.30
	BOWEN RATIO (no units) 0.105			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
63%	82%	68%	139%	44%	5%	41%	183%	34%	105%	16%	54%	68%
196%	196%	46%	41%	124%	0%	19%	165%	23%	64%	147%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091730  
 START TIME: 17:30:30 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN P. 1:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.020 (0.02) AT 6M	MOMENTUM FLUX (Nt/m2) -3.13E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 5.014E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.95E-05 (8.9E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.347E-05 (3.0E-05)
Z/L AT 6M 0.020 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.13E 02 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 8.12E-02 (2.0E-02)
Z/L AT 10 METERS 0.021 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.31E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 5.263E-04 (6.0E-05)
MONTIN-OBUKHOV LENGTH (Meters) 4.667E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.213E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.75E 01 (3.0E+01)	
	BOWEN RATIO (no units) -0.305 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ARBITRARY VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAW COEF.
130%	151%	2%	20%	92%	0%	129%	142%	12%	29%	91%	39%	29%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* METEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 270000000  
START TIME: 0000Z 05 JUN 80  
END TIME: 0000Z 06 JUN 80  
DATE: 05 JUN 1980 (DAY 107)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 30 min  
NOMINATURE: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* \* \* \* \* METEOROLOGICAL DATA \* \* \* \* \*

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS \* \* \* \* \*

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27	NO. 28
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36	NO. 37	NO. 38
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45	NO. 46	NO. 47	NO. 48
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 49	NO. 50	NO. 51	NO. 52	NO. 53	NO. 54	NO. 55	NO. 56	NO. 57	NO. 58
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 59	NO. 60	NO. 61	NO. 62	NO. 63	NO. 64	NO. 65	NO. 66	NO. 67	NO. 68
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 69	NO. 70	NO. 71	NO. 72	NO. 73	NO. 74	NO. 75	NO. 76	NO. 77	NO. 78
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## \* \* \* \* \* DATA USED IN CALCULATIONS \* \* \* \* \*

NO. 79	NO. 80	NO. 81	NO. 82	NO. 83	NO. 84	NO. 85	NO. 86	NO. 87	NO. 88
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

RUN NUMBER: 7905091800  
 START TIME: 18: 0:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DLP POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)	REF. INDEX (Kelvin-2/3)
12.692	11.23	9.17	NO DATA	1011.26	13.636	-0.944	-0.845	0.300	0.398	NO DATA
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (millibars)	S.VAP. PRES. (millibars)		
10.00	12.790	13.935	14.033	8.793E-03	79.14	7.157E-03	11.586	14.641		

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
KAD. RICHARDSON NUMBER (+Stable, - Unstable) -0.021 At 10m	MOMENTUM FLUX (N/m2) -2.12E-01	FRICTION VELOCITY (Meters/sec) 4.158E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.729E-01	AIR DENSITY (Kg/m3) 1.2271
GEOMETRIC MEAN HEIGHT (meter) LMT=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 4.44E-05	SCALING SPEC. HUMID. (Kg/Kg) 8.705E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.44E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.415E-02
Z/L AT 10m -0.027	LAT. HEAT FLUX (Watts/m2) 1.10E-02	SCALING POT. TEMP. (Kelvin) -2.583E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.074E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9014E-05
Z/L AT 10 METERS -0.020	SEN. HEAT FLUX (Watts/m2) 1.33E-01	ROUGHNESS LENGTH (Meters) 2.562E-04		VAP. PRES. AT WT LEVEL (millibar) 15.591
MONIN-OBUKHOV LENGTH (Meters) -4.832E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) -4.53E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.371E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.178E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.78E-01			BAR. PRES. AT WT LEVEL (millibar) 1012.46
	BOWEN RATIO (no units) 0.121			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10m	Z/L AT 10m	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
80%	166%	81%	146%	58%	7%	74%	204%	41%	106%	17%	61%	81%
159%	159%	46%	41%	117%	7%	29%	158%	23%	64%	140%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091800  
 START TIME: 18: 0:50 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LARGEST LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
KAD. RICHARDSON NUMBER (+Stable, - Unstable) -0.041 At 10m	MOMENTUM FLUX (N/m2) (-2.24E-01 (16.6E-02))	FRICTION VELOCITY (Meters/sec) (4.319E-01 (16.1E-02))
GEOMETRIC MEAN HEIGHT (meter) LMT=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) (4.44E-05 (10.0E-06))	SCALING SPEC. HUMID. (Kg/Kg) (7.21E-05 (3.0E-05))
Z/L AT 10m -0.016 At 10m	LAT. HEAT FLUX (Watts/m2) (1.09E-02 (12.0E-03))	SCALING POT. TEMP. (Kelvin) (3.773E-02 (12.0E-02))
Z/L AT 10 METERS -0.012 At 10m	SEN. HEAT FLUX (Watts/m2) (1.35E-01 (13.0E-01))	ROUGHNESS LENGTH (Meters) (3.907E-04 (16.0E-05))
MONIN-OBUKHOV LENGTH (Meters) -0.472E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) (4.53E-01 (12.0E-01))	DRAW COEF. AT 10 METERS (Dimensionless) (1.479E-03 (14.0E-04))
	TOTAL HEAT BUDGET FLUX (Watts/m2) (7.54E-01 (13.6E-01))	
	BOWEN RATIO (no units) (0.193 (10.0E-01))	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABOVE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10m	Z/L AT 10m	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
124%	150%	11%	27%	18%	8%	77%	26%	5%	26%	120%	18%	1%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905091838  
START TIME: 18:31:10 PST  
END TIME: 19:11:10 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNELS 100/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	WIND SPEED 3	WIND SPEED 4	WIND SPEED 5
6.205	0.001	0.001	4.945	5.018	5.063	5.024	4.725	6.050	5.050
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZIRU REF.	SPARE A	SPARE B	WIND THERM B	WIND THERM C	WIND THERM D
3.939	3.842	2.543	0.001	3.331	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
UPWIND NEAR	UPWIND LAND	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL	DIFFERENTIAL
HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH	HEIGHT/LENGTH
0.183	0.5	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006

## \* SYSTEM HOUSEKEEPING PARAMETERS (TRANSLATED INTO ENGINEERING UNITS)

MANUAL FLAG	ERROR COUNT	DATA SCAN	VOLT. REF. DEW	VOLT. REF. DEW	ZIRU REF. DEW	AC VOLTAGE	AC FREQUENCY	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CALL AND ESCAPEMENT CORRECTIONS) (TRANSLATED INTO ENGINEERING UNITS)

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	AIR TEMP. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Degrees)	(Degrees)	(Degrees)	(Degrees)	(Degrees)	(Celsius)
12.465	11.28	9.22	NO DATA	316.3	131.71	131.71	131.71	131.71	12.568
AIR TEMP. 2 <td>WIND SPEED 2 <td>DEW POINT 2 <td>TEMP. STRUCT. 2 <td>TID. TARGE <td>BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td></td></td></td></td></td>	WIND SPEED 2 <td>DEW POINT 2 <td>TEMP. STRUCT. 2 <td>TID. TARGE <td>BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td></td></td></td></td>	DEW POINT 2 <td>TEMP. STRUCT. 2 <td>TID. TARGE <td>BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td></td></td></td>	TEMP. STRUCT. 2 <td>TID. TARGE <td>BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td></td></td>	TID. TARGE <td>BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td></td>	BAR. PRESS. 1 <td>BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td></td>	BAR. PRESS. 2 <td>BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td></td>	BAR. PRESS. 3 <td>BAR. PRESS. 4 <td>AIR TEMP. 3</td> </td>	BAR. PRESS. 4 <td>AIR TEMP. 3</td>	AIR TEMP. 3
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
12.568	10.48	9.29	NO DATA	0.55	1011.96	1011.96	1011.96	1011.96	12.568

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRESS. 1	S. VAP. PRESS. 1	REL. INDEX. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(millibar)	(millibar)	(Celsius)
18.35	12.645	13.712	13.892	0.0152-03	81.60	7.102-03	11.019	14.416	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AIR HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRESS. 2	S. VAP. PRESS. 2	REL. INDEX. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(millibar)	(millibar)	(Celsius)
9.20	12.658	13.821	13.911	0.0152-03	80.39	7.210-03	11.051	14.540	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905091838  
START TIME: 18:31:10 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNELS 100/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSHING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.066 AT GH	MOMENTUM FLUX (Nt/m2) -2.79E-01	FRICTION VELOCITY (Meters/sec) 4.767E-01	GENERAL FORM: DN/DZ = 1/(N1-N2)/11n(71/22)* 71/22	GENERAL FORM: NTS/DZ = 1/(N21-PS1)-(N22-PS11)/ (N1-N2)
GEOMETRIC MEAN HEIGHT (meter) GH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.73E-05	SCALING SPEC. HUMID. (kg/kg) -6.380E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 8.90E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 8.39E-01
Z/L AT GH -0.008	LAT. HEAT FLUX (Watts/m2) 9.23E-01	SCALING POT. TEMP. (Kelvin) -1.065E-02	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (kg/kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 8.43E-03
Z/L AT 10 METERS -0.007	SEN. HEAT FLUX (Watts/m2) 6.30E-00	ROUGHNESS LENGTH (Meters) 4.095E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -1.49E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PK SLOPE = 5.01E-01
Z/L AT Z1 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.26E-00	DRAW CODE AT 10 METERS (Dimensionless) 4.10E-03		
Z/L AT Z2 -0.066	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.06E-02			
MONIN-ORUKHOV LENGTH (Meters) -1.534E-03	BOWEN RATIO (no units) 6.668			
PS11 AT Z1 = 0.042355 PS11 AT Z2 = 0.021897 PS12 AT Z1 = 0.025994 PS12 AT Z2 = 0.013231				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) 0.4	GRAVITATION ACCELERATION (M/sec 2) 9.7959	PROFILE TUN. SCHMIDT NUMBER 0.74	PROFILE TUN. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.92E-03	BULK HUMIDITY TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY (kg/m3) 1.2280
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AIR SPECIFIC HEAT (J/cal. /kg. kelvin) 2.045E-02
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WATER LAT. HEAT VAP. (J/cal. /kg) 5.9024E-04
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\* CONTINUED ON NEXT PAGE



RUN NUMBER: 7905091830  
 START TIME: 18:11:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS.

AIR TEMP (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STUC. (Kelvin 2/3)	BAR PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V-POT-WT TEMP (Kelvin)
12.552	10.58	9.28	NO DATA	1011.71	13.582	-1.027	0.929	0.202	6.343
MO. HGT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ABS HUMID. (Kg/M3)	REL HUMID. (Percent)	SPEC HUMID. (Kg/Kg)	VAP. PRES. (Millibar)	S. VAP. PRES. (Millibar)	REF. IND. X (Kelvin 2/3)
10.00	12.653	13.807	13.905	8.853E-03	89.42	7.208E-03	11.074	14.517	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIENE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.027 AT GMM	MOMENTUM FLUX (Nt/m2) -1.82E-01	FRICTION VELOCITY (Meters/sec) 3.155E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.486E-01	AIR DENSITY (Kg/m3) 1.2282
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 4.04E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.530E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.039E-01	AIR SPECIFIC HEAT (Jcal./Kg Kelv.) 2.4174E-02
Z/L AT GMM -0.034	LAT. HEAT FLUX (Watts/m2) 9.98E-01	SCALING POT. TEMP. (Kelvin) -2.864E-02	WITH POT. TEMPERATURE (Meter Kelv./sec) 1.104E-02	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9621E-05
Z/L AT 10 METERS -0.026	SEN. HEAT FLUX (Watts/m2) 1.37E-01	ROUGHNESS LENGTH (Meters) 1.968E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.544
MONIN-OBUKHOF LENGTH (Meters) -3.783E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.26E-00	DRAW COEF. AT 10 METERS (Dimensionless) 1.328E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.01E-02			BAR. PRES. AT WT LEVEL (Millibar) 1012.91
	BOWEN RATIO (no units) 0.137			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
136%	136%	91%	152%	112%	15%	133%	265%	45%	167%	67%	65%	91%
184%	184%	46%	42%	112%	15%	37%	154%	23%	61%	136%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091830  
 START TIME: 18:31:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 [0.02] AT GMM	MOMENTUM FLUX (Nt/m2) -2.15E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.162E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.94E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.720E-05 [3.0E-05]
Z/L AT GMM 0.019 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.82E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -1.662E-02 [2.0E-02]
Z/L AT 10 METERS -0.015 [0.02]	SEN. HEAT FLUX (Watts/m2) 1.00E-01 [3.0E+00]	ROUGHNESS LENGTH (Meters) 2.813E-04 [6.0E-05]
MONIN-OBUKHOF LENGTH (Meters) -6.667E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 7.26E-00 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.565E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.18E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.112 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
53%	50%	24%	4%	37%	0%	7%	32%	12%	14%	47%	39%	40%

## MARINE SURFACE LAYER MICROMETEOROLOG. EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* METEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 2905091900  
START TIME: 19:13:20 PST  
END TIME: 19:31:30 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
TEMPERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## A. ANALOG CHANNEL RAW DATA (OVERAGE MODE):

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
SEA LEVEL	TEMP. TROLL	TEMP. STRUCT	DEW POINT	DEW POINT	WIND SPEED	WIND SPEED	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.000	0.000	0.001	4.961	5.030	6.620	5.220	4.744	-0.104	5.119
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
REF. WT. TEMP.	REF. WT. TEMP.	REF. WT. TEMP.	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. TREF. B		
0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001		

## B. ANALOG CHANNEL RAW DATA (OVERAGE MODE):

ESCALATION DATA, FIELD CALIBRATION AND WIND SPEED ESCALATION CORRECTIONS:

NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
AIR TEMP. 1	AIR TEMP. 2	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK
14.114705	14.114705	0.1105	0.1105	0.1105	0.1105	0.1105	0.1105	0.1105	0.1105

## C. ANALOG CHANNEL RAW DATA (OVERAGE MODE): TRANSLATED INTO ENGINEERING UNITS:

BAR. PRES. 1	BAR. PRES. 2	DATA DATE	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK	WINDING MARK
1013.9	1013.9	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## D. ANALOG CHANNEL RAW DATA (OVERAGE MODE): TRANSLATED INTO ENGINEERING UNITS:

WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.	WIND DIR.
319.0	319.0	319.0	319.0	319.0	319.0	319.0	319.0	319.0	319.0

## E. ANALOG CHANNEL RAW DATA (OVERAGE MODE): TRANSLATED INTO ENGINEERING UNITS:

REL. HUMID. 1	REL. HUMID. 2	REL. HUMID. 3	REL. HUMID. 4	REL. HUMID. 5	REL. HUMID. 6	REL. HUMID. 7	REL. HUMID. 8	REL. HUMID. 9	REL. HUMID. 10
81.24	81.24	81.24	81.24	81.24	81.24	81.24	81.24	81.24	81.24

## F. ANALOG CHANNEL RAW DATA:

RUN NUMBER: 2905091900  
START TIME: 19:13:20 PST  
END TIME: 19:31:30 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
ATM. MICROMETEOROLOG.  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 30 Min  
TEMPERATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## G. PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRISINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
UNSTABLE (+UP, -DOWN)	MOISTURE FLUX (kg/m <sup>2</sup> ) -3.41E-01	FRICITION VELOCITY (meters/sec) 5.266E-01	GENERAL FORM: DN/DZ [(N1-N2)/1+(N1/21/22)* (Z1*Z2)/1/21]	GENERAL FORM: N SLOPE [(N1-N2)/(1-N1/21/22)* (Z1*Z2)/1/21]
UNSTABLE (+UP, -DOWN)	HUMIDITY FLUX (kg/m <sup>2</sup> ) -4.17E-05	SCALING SPEC. HUMID. (kg/kg) -6.427E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ= 9.71E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 7.60E-01
UNSTABLE (+UP, -DOWN)	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.03E-02	SCALING POT. TEMP. (Kelvin) 1.835E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) DSH/DZ= -8.92E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.41E-03
UNSTABLE (+UP, -DOWN)	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.46E-01	ROUGHNESS LENGTH (Meters) 5.724E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ= -7.55E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -3.95E-01
UNSTABLE (+UP, -DOWN)	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.09E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 0.420E-03		N-LTEMP. STRUCT. (K-m-2/3) Z-HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
UNSTABLE (+UP, -DOWN)	WIND RATIO (m/sec) 6.117			

## H. GENERAL CONSTANTS:

VON KARMAN CONSTANT	GRAVITATION ACCELERATION	PROFILE TOW. PRANDTL NUMBER	PROFILE TOW. SCHMIDT NUMBER	BULK SOLAR HEAT TRANSFER COEFF.	BULK MOISTURE TRANSFER COEFF.
0.4	9.7957	0.74	0.74	6.92E-03	1.32E-03

## I. GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by interpolation of

SHI SHI = 1.00E-03 kg/kg

## J. MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2284

AIR SPECIFIC HEAT  
(J/cal./kg K)  
0.41E-02

WATER LAT. HEAT VAP.  
(J/cal./kg)  
5.9825E-05

RUN NUMBER: 7905091900  
 START TIME: 19:10:00 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* LISTED METEOROLOGICAL PARAMETERS AT TEN METERS.

AIR TEMP (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STUC. (Millim-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	ATR-WT TEMP (Kelvin)	P.T-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.535	10.81	9.35	NO DATA	1011.99	13.542	-1.066	-0.968	0.254	0.352
HEIGHT (Meters)	POT TEMP (Celsius)	VIR TEMP (Celsius)	V.POT TEMP (Celsius)	ABS HUMID. (Kg/m3)	REL HUMID. (Percent)	SPEC HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.634	13.796	13.894	8.982E-03	80.58	7.249E-03	11.744	14.503	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (unstable, unstable) -0.025 AT 10M	MOMENTUM FLUX (Nt/m2) -1.93E-01	FRICITION VELOCITY (meter/sec) 3.965E-01	WITH LONG. VELOCITY (meter2/sec2) -1.572E-01	AIR DENSITY (Kg/m3) 1.2286
GEOMETRIC MEAN HEIGHT (Meter) GRM=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 4.07E-05	SCALING SPEC. HUMID. (Kg/Kg) -0.245E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 4.014E-05	AIR SPECIFIC HEAT (Jtcal./Kg Kel.) 2.415/E 02
Z/L AT 10M -0.037	LAT. HEAT FLUX (Watts/m2) 9.93E-01	SCALING POT. TEMP. (Kelvin) -2.782E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.184E-02	WATER LAT. HEAT VAP. (Jtcal./Kg) 5.962E 05
Z/L AT 10 METERS -0.024	SEN. HEAT FLUX (Watts/m2) 1.37E-01	ROUGHNESS LENGTH (Meters) 2.172E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.507
MONIN-OBUKHOV LENGTH (Meters) -4.120E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.344E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.28E-02			BAR. PRES. AT WT LEVEL (Millibar) 1013.19
	ROMEN RATIO (no. unit) 0.138			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES.  
 TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICITION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
107%	107%	83%	147%	82%	10%	117%	279%	41%	166%	41%	61%	83%
105%	105%	76%	42%	113%	10%	35%	155%	33%	65%	136%	43%	40%

\* CONTINU D BELOW

RUN NUMBER: 7905091900  
 START TIME: 19:10:00 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ) :

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (unstable, unstable) -0.015 AT 10M AT 10M	MOMENTUM FLUX (Nt/m2) -1.46E-01 (1.1E-02)	FRICITION VELOCITY (meter/sec) 4.429E-01 (1.6E-02)
GEOMETRIC MEAN HEIGHT (Meter) GRM=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 4.05E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -2.551E-05 (3.0E-05)
Z/L AT 10M -0.019 (1.0E-02)	LAT. HEAT FLUX (Watts/m2) 1.00E-02 (1.0E-03)	SCALING POT. TEMP. (Kelvin) -2.053E-02 (2.0E-03)
Z/L AT 10 METERS -0.015 (1.0E-02)	SEN. HEAT FLUX (Watts/m2) 1.27E-01 (3.0E-02)	ROUGHNESS LENGTH (Meters) 3.634E-04 (1.0E-04)
MONIN-OBUKHOV LENGTH (Meters) -6.725E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E-02)	DRAG COEF. AT 10 METERS (Meters) 1.694E-03 (1.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.20E-02 (3.0E-03)	
	ROMEN RATIO (no. unit) 0.130 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD FLUX	TOTAL HEAT FLUX	ROMEN RATIO	FRICITION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
41%	39%	31%	2%	7%	6%	1%	8%	15%	17%	26%	50%	34%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \*

RUN NUMBER: 7905091930  
START TIME: 19:31:40 PST  
END TIME: 20:11:50 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 06	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. K.F.F.A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.265	0.060	0.061	4.954	5.031	5.832	5.589	4.756	-0.100	5.101

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B
3.084	3.684	2.555	0.001	0.001	0.001	0.001	6.235

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND FARB	DP1 CORR.	DP2 CORR.	WIND CORR.	WIND CORR.	WIND CORR.
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411 124585	1421 125732	0.183	-8	-0.008	0.053	0.003	0.003	0.003

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DEV.	VOLT. REF. DEV.	ZERO REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	180	0	0	0	0	0	115.6	59.68

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	ALAN AIR TEMP.
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Kelvin-2/3)
12.458	11.32	9.27	NO DATA	319.1	1011.17	1.400 11	13.529	265.676

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter-2SL)	(Millibar)
12.573	10.42	9.35	NO DATA	0.73	1012.27

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.638	13.710	13.890	8.848E-03	80.89	7.205E-03	11.663	14.417	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.663	13.833	13.923	8.908E-03	80.78	7.259E-03	11.747	14.547	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905091930  
START TIME: 19:31:40 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 30 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+=INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.009 AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -3.64E-01	FRICTION VELOCITY (Meters/sec) 5.44E-01	GENERAL FORM: DN/DZ = (N1-N2)/((N1-Z1)/(Z1-Z2))	GENERAL FORM: A SLOPE = ((N1-Z1)/(N1-Z2)) - ((N2-Z1)/(N1-Z2))
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 4.30E-05	SCALING SPEC. HUMID. (Kg/Kg) -6.43E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = 1.00E-01	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert Axis PS1=PS11 WS SLOPE = 7.35E-01
Z/L AT GMM -0.012	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 1.06E 02	SCALING POT. TEMP. (Kelvin) -2.01E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert Axis PS1=PS11 SH SLOPE = -8.40E 03
Z/L AT 10 METERS -0.010	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 1.36E 01	ROUGHNESS LENGTH (Meters) 6.37E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -2.79E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert Axis PS1=PS11 PTK SLOPE = 2.65E 01
Z/L AT Z1 -0.017	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 3.46E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.71E-03		N-TEMP. STRUCT. (K/M 2/3) Z-HEIGHT (M) Vert Axis PS1=PS11 C12 SLOPE=NO DATA
Z/L AT Z2 -0.009	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.34E 02			
MUNIN-DEUKHOV LENGTH (Meters) -1.049E 03	BOWEN RATIO (no units) 0.128			
PS11 AT Z1 = 0.060816 PS11 AT Z2 = 0.031612 PS12 AT Z1 = 0.037211 PS12 AT Z2 = 0.019169				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (m/sec 2)	PROFILE TOK. PRANDTL NUMBER	PROFILE TOK. SCHMIDT NUMBER	BULK SLN. HEAT TRANSF. COEFF.	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .00E-3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2285

AIR SPECIFIC HEAT  
(J/Kg.Kel.)  
2.41E+02

WATER LAT. HEAT VAP.  
(J/Kg.Kel.)  
5.9024E 05

RUN NUMBER: 7905091930  
 START TIME: 19:31:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.559	10.52	9.35	NO DATA	1012.18	13.529	-6.969	-0.871	0.289	0.387

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m-2/3)
10.00	12.657	13.818	13.916	8.901E-03	83.79	7.244E-03	11.737	14.527	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.026 AT 10M	MOMENTUM FLUX (Nt/m2) -1.80E-01	FRICTION VELOCITY (Meters/sec) 3.830E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.467E-01	AIR DENSITY (Kg/m3) 1.2287
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.91E-05	SCALING SPEC. HUMID. (Kg/Kg) -0.298E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.905E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.415E-02
Z/L AT 10M -0.033	LAT. HEAT FLUX (Watts/m2) 9.65E-01	SCALING POT. TEMP. (Kelvin) -2.725E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.044E-02	WATER LAT. HEAT VAP (ITcal./Kg) 5.9821E-05
Z/L AT 10 METERS -0.025	SFN. HEAT FLUX (Watts/m2) 1.30F-01	ROUGHNESS LENGTH (Meters) 1.925E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.496
MONIN-OBUKHOV LENGTH (Meters) -3.926E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAW COEF. AT 10 METERS (Dimensionless) 1.325F-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.24E-02			BAR. PRES. AT WT LEVEL (Millibar) 1013.38
	BOWEN RATIO (no units) 0.134			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
100%	100%	78%	144%	76%	10%	114%	221%	39%	105%	37%	59%	78%
187%	187%	46%	42%	115%	10%	35%	158%	23%	65%	138%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905091930  
 START TIME: 19:31:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 30 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.015 [0.02] AT 10M	MOMENTUM FLUX (Nt/m2) -2.48E-01 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 4.427E-01 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.99E-05 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -7.584E-05 [3.0E-05]
Z/L AT 10M -0.020 [0.02]	LAT. HEAT FLUX (Watts/m2) 9.87E-01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -2.162E-02 [2.0E-02]
Z/L AT 10 METERS -0.015 [0.02]	SFN. HEAT FLUX (Watts/m2) 1.33E-01 [3.6F+00]	ROUGHNESS LENGTH (Meters) 3.799E-04 [6.0E-05]
MONIN-OBUKHOV LENGTH (Meters) -6.638E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 [2.0E+01]	DRAW COEF. AT 10 METERS (Meters) 1.796E-03 [4.0E-04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.27E-02 [3.0E+01]	
	BOWEN RATIO (no units) 0.132 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ARITHMETIC VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SFN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
44%	42%	38%	6%	2%	0%	5%	7%	19%	13%	19%	59%	41%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 790509000  
START TIME: 20:20:00  
END TIME: 20:30:10 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE MODE):

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg.)	TEMP. STRUCT. (Celsius)	TEMP. STRUCT. (Celsius)	DEW POINT (Celsius)	DEW POINT (Celsius)	WIND SPEED (M/sec)	WIND SPEED (M/sec)	BAR. PRES. (milibar)	SKY RAD. (Watt/m <sup>2</sup> )	WIND DIR. (Deg.)
314.8	13.659	13.659	8.971	8.971	5.517	5.517	4.780	-0.105	4.987
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17		
BULK WT. TEMP. (Celsius)	AIR FREQ. (Hz)	AIR FREQ. (Hz)	HUMID. FLAG (Celsius)	ZERO REF. (Celsius)	SPARE A (Celsius)	SPARE B (Celsius)	VOLT. REF. (Celsius)		
13.530	59.69	59.69	0.001	0.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

NO. 1	NO. 2	UPWIND NEAR	UPWIND FAN	DIFF. CAL	DIFF. CAL	DIFF. CAL	DIFF. CAL	DIFF. CAL	DIFF. CAL
AIR TEMP. (Celsius)	AIR TEMP. (Celsius)	H. LGTH/LENGTH (Meters)	H. LGTH/LENGTH (Meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
14.112494	14.112494	0.103	59	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008

## \* ANALOG CHANNELING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg.)	TEMP. STRUCT. (Celsius)	TEMP. STRUCT. (Celsius)	DEW POINT (Celsius)	DEW POINT (Celsius)	WIND SPEED (M/sec)	WIND SPEED (M/sec)	BAR. PRES. (milibar)	SKY RAD. (Watt/m <sup>2</sup> )	WIND DIR. (Deg.)
314.8	13.659	13.659	8.971	8.971	5.517	5.517	4.780	-0.105	4.987

## \* ANALOG CHANNELING PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg.)	TEMP. STRUCT. (Celsius)	TEMP. STRUCT. (Celsius)	DEW POINT (Celsius)	DEW POINT (Celsius)	WIND SPEED (M/sec)	WIND SPEED (M/sec)	BAR. PRES. (milibar)	SKY RAD. (Watt/m <sup>2</sup> )	WIND DIR. (Deg.)
314.8	13.659	13.659	8.971	8.971	5.517	5.517	4.780	-0.105	4.987

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (Deg.)	TEMP. STRUCT. (Celsius)	TEMP. STRUCT. (Celsius)	DEW POINT (Celsius)	DEW POINT (Celsius)	WIND SPEED (M/sec)	WIND SPEED (M/sec)	BAR. PRES. (milibar)	SKY RAD. (Watt/m <sup>2</sup> )	WIND DIR. (Deg.)
314.8	13.659	13.659	8.971	8.971	5.517	5.517	4.780	-0.105	4.987

## \* CALCULATED FLUXES

RUN NUMBER: 790509000  
START TIME: 20:20:00  
END TIME: 20:30:10 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NOL MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE LARGES WITHIN BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSTING, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR, -WITH HEIGHT)
GRAV. RICHARDSON NUMBER ( $g \Delta T / (T_z^2 W)$ ) AT 10M	MOMENTUM FLUX (N/m <sup>2</sup> ) -2.80E-01	FRICTION VELOCITY (Meters/sec) 4.818E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1/N1 + 1/N2) \times (Z1+Z2)^{1/2}$	GENERAL FORM: $N \text{ SLOPE} = (1/N1 - 1/N2) / (1/N1 + 1/N2)$
WIND COR. FROM WIND ( $W^2 / (Z1+Z2)^{1/2}$ ) AT 10M	HEAT FLUX (Kq/sec m <sup>2</sup> ) 3.65E-05	SCALING SPEC. HUMID. (Kq/Kg) 6.49E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ= 8.73E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE= 8.30E-01
Z/L AT 10M 0.018	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.51E-01	SCALING POT. TEMP. (Kelvin) -2.237E-02	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (Meters) DSH/DZ= -8.92E-06	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= 8.32E-03
Z/L AT 10 METERS -0.014	SKY HEAT FLUX (Watts/m <sup>2</sup> ) 1.34E-01	ROUGHNESS LENGTH (Meters) 4.247E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ= -3.07E-03	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE= -2.42E-01
Z/L AT 20 0.013	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.449E-03		N=LNTMP. STRUCT. (Kq/M-2/3) Z=HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
WIND DIRECTION LENGTH (Meters) -7.315E-02	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.23E-02			
PSI AT 10= 0.084714 PSI AT 20= 0.144621 PSI AT 10= 0.052198 PSI AT 20= 0.022169	BOWEN RATIO (no units) 0.141			

## \* GENERAL CONSTANTS:

GRAV. CONSTANT (M/sec <sup>2</sup> ) 9.80665	GRAVITATION ACCELERATION (M/sec <sup>2</sup> ) 9.80665	PROFILE TUX. PRANDTL NUMBER 0.74	PROFILE TUX. SCHMIDT NUMBER 0.74	BULK SEN. HEAT TRANSF. COEFF. 0.97E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation extended by insertion of:

PSI SLOPE = 1/2 = 0.5 Kq/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kq/m<sup>3</sup>)  
1.2291

AIR SPECIFIC HEAT  
(J/Kg.Kel.)  
2.4157E-02

WATER LAT. HEAT VAP.  
(J/Kg.Kel.)  
5.9026E-05

RUN NUMBER: 7905092000  
 START TIME: 20: 2: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
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 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 4/Min  
 DATA AVERAGING PERIOD: 28 Min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3) NO DATA	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.512	9.93	9.42		1012.54	13.530	-1.818	-0.920	6.246	0.344
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3) NO DATA
10.00	12.610	13.776	13.874	8.946E-03	61.41	7.277E-03	11.794	14.488	

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.033 AT 0M	MOMENTUM FLUX (Nt/m2) -1.56E-01	FRICTION VELOCITY (Meters/sec) 3.559E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.266E-01	AIR DENSITY (Kg/m3) 1.2294
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.97	HUMIDITY FLUX (Kg/sec m2) 3.67E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.301E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 3.631E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4157E 02
Z/L AT GMH -0.041	LAT. HEAT FLUX (Watts/m2) 8.97E 01	SCALING POT. TEMP. (Kelvin) -2.922E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 1.040E-02	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9024E 05
Z/L AT 10 METERS -0.032	SIN. HEAT FLUX (Watts/m2) 1.29E 01	ROUGHNESS LENGTH (Meters) 1.48E-04		VAP. PRES. AT WT LEVEL (Millibar) 15.503
MONIN-OBUKHOV LENGTH (Meters) -3.160E 07	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.285E-03		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.17E 02			BAR. PRES. AT WT LEVEL (Millibar) 1013.74
	BOWEN RATIO (no units) 0.144			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
102%	102%	84%	148%	77%	10%	114%	224%	42%	106%	35%	62%	84%
184%	184%	46%	47%	112%	10%	35%	155%	23%	85%	135%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905092000  
 START TIME: 20: 2: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
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\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.021 (6.0E-02) AT 0M	MOMENTUM FLUX (Nt/m2) -2.11E-01 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 4.004E 01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.97	HUMIDITY FLUX (Kg/sec m2) 3.77E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.611E-05 (3.0E-05)
Z/L AT GMH 0.070 (9.0E-02)	LAT. HEAT FLUX (Watts/m2) 9.09E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.476E-02 (2.0E-02)
Z/L AT 10 METERS -0.020 (9.0E-02)	SIN. HEAT FLUX (Watts/m2) 1.50E 01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.615E-04 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.900E 07	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (Meters) 1.760E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.19E 02 (3.0E+01)	
	BOWEN RATIO (no units) 0.143 (0.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SIN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
47%	47%	34%	3%	2%	0%	3%	1%	16%	12%	17%	54%	37%

\* END OF DATA FILE

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905092030  
START TIME: 21: 0: 0 PST  
END TIME: 21:27:50 PST  
START DATE: 9 May 1979 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNEL(S) / MIN  
DATA AVERAGING PERIOD: 20 MIN  
SURFACE LEVEL: 1000 FT  
SEA SURFACE LEVEL: 200 FT

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	WIND SPEED 3	WIND SPEED 4	WIND SPEED 5
6.265	0.000	0.001	4.955	5.000	5.000	5.000	5.000	5.000	5.000
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19
BULK WT. TEMP.	AC. FREQUENCY	AC. VOLTAGE	ANALOG FLAG	2000 Hz	2000 Hz	2000 Hz	2000 Hz	2000 Hz	2000 Hz
3.919	3.854	2.552	3.431	3.431	3.431	3.431	3.431	3.431	3.431

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9
AIR TEMP. 1	AIR TEMP. 2	UPWIND NEAR	UPWIND FINE	UPWIND FINE	UPWIND FINE	UPWIND FINE	UPWIND FINE	UPWIND FINE
1411 124005	1421 125247	HEIGHT/LENGTH	PATH/HEIGHT	PATH/HEIGHT	PATH/HEIGHT	PATH/HEIGHT	PATH/HEIGHT	PATH/HEIGHT
		0.133	0.133	0.133	0.133	0.133	0.133	0.133

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

ANALOG FLAG	ERROR COUNT	DATA RATE	DATA RATE	DATA RATE	DATA RATE	DATA RATE	DATA RATE	DATA RATE
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	168	168	168	168	168	168	168

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CALL AND EVEN POINT CORRECTIONS) TRANS. W/1 INTO EN. INDEXING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5
(Celsius)	(Meter/sec)	(Celsius)	(Celsius 2/3)	(Degree)	(Degree)	(Degree)	(Degree)	(Degree)
12.498	11.27	9.28	NO DATA	315.6	315.6	315.6	315.6	315.6
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2 <td>TEMP. STRUCT. 2</td> <td>WIND DIR. 1</td> <td>WIND DIR. 2</td> <td>WIND DIR. 3</td> <td>WIND DIR. 4</td> <td>WIND DIR. 5</td>	TEMP. STRUCT. 2	WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5
(Celsius)	(Meter/sec)	(Celsius)	(Celsius 2/3)	(Degree)	(Degree)	(Degree)	(Degree)	(Degree)
12.525	10.46	9.35	NO DATA	315.6	315.6	315.6	315.6	315.6

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARG. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	WIND PRESS. 1	S. WIND PRESS. 1	POT. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Celsius 2/3)
18.35	12.583	13.668	13.846	8.861E-03	81.22	7.211E-03	11.678	14.372	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARG. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	WIND PRESS. 2	S. WIND PRESS. 2	POT. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Celsius 2/3)
9.20	12.615	13.783	13.873	8.910E-03	81.30	7.244E-03	11.747	14.513	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905092030  
START TIME: 21: 0: 0 PST  
START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNEL(S) / MIN  
DATA AVERAGING PERIOD: 20 MIN  
SURFACE LEVEL: 1000 FT  
SEA SURFACE LEVEL: 200 FT

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.012 AT GH	MOMENTUM FLUX (Nt/m2) -3.85E-01	FRICTION VELOCITY (Meters/sec) 4.984E-01	GENERAL FORM: DN/DZ = [(N1-N2)/(L1N1+L2N2)] (21/22)1/21	GENERAL FORM: N1 SLOPE = [(N1-N2)/(L1N1+L2N2)] (21/22)1/21
GEOMETRIC MEAN HEIGHT (Meter) GH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.97E-05	SCALING SPEC. HUMID. (kg/kg) -6.476E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = 9.00E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1/PS11 WS SLOPE = 8.00E-01
Z/L AT GH -0.016	LAT. HEAT FLUX (Watts/m2) 9.81E-01	SCALING POT. TEMP. (Kelvin) -2.150E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PS1/PS12 SH SLOPE = 0.34E-03
Z/L AT 10 METERS -0.012	SEN. HEAT FLUX (Watts/m2) 1.33E-01	ROUGHNESS LENGTH (Meters) 4.76E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -2.96E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1/PS13 PTR SLOPE = 2.50E-01
Z/L AT Z1 -0.022	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.300E-04		
Z/L AT Z2 -0.011	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E-02			
MONIN-OBUKHOV LENGTH (Meter) -8.176E-02	BIMEN RATIO (no units) 0.136			
PS11 AT Z1 = 0.076552 PS11 AT Z2 = 0.149142 PS12 AT Z1 = 0.047654 PS12 AT Z2 = 0.024408				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units) <th>GRAVITATION ACCELERATION (m/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (m/sec 2) <th>PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th></th>	PROFILE TUR. PRANDTL NUMBER <th>PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th></th>	PROFILE TUR. SCHMIDT NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th></th>	BULK SEN. HEAT TRANSF. COEFF. <th>BULK MOISTURE TRANSF. COEFF. </th>	BULK MOISTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTE 1:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = 47.00E-03 kg/kg.

## \* MISCELLANEOUS

AIR DENSITY (kg/m3)
1.2294

AIR SPECIFIC HEAT (J/kg K)
1.0135

WATER LAT. HEAT CAP (J/kg K)
4.1868



RUN NUMBER: 7905092030  
 START TIME: 21: 01: 0 PM  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin 2/3)	BAR. PRES. (millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT. WT TEMP. (Kelvin)	VIR. WT TEMP. (Kelvin)	V.POT. WT TEMP. (Kelvin)
12.511	10.56	9.35	NO DATA	1012.71	13.563	-1.052	-0.954	0.205	0.303

HEIGHT (meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (kg/kg)	VAP. PRES. (millibars)	S. VAP. PRES. (millibars)	REF. INDEX (Kelvin 2/3)
10.00	12.609	13.754	13.066	8.904E-03	81.02	7.247E-03	11.739	14.469	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (KRIEGER ET AL, 1970):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.008 AT GHH	MOMENTUM FLUX (Nt/m2) -1.80E-01	FRICITION VELOCITY (meter/sec) 3.045E-01	WITH LONG. VELOCITY (meter2/sec2) 1.478E-01	AIR DENSITY (kg/m3) 1.2296
GEOMETRIC MEAN HEIGHT (meter) GHH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.92E-05	SCALING PTFE HUMID. (kg/kg) -8.368E-05	WITH ABS. HUMIDITY (meter kg/sec m3) 3.950E-05	AIR SPECIFIC HEAT (Jcal./kg Kel.) 2.415E+02
Z/L AT GHH -0.035	LAT. HEAT FLUX (Watts/m2) 9.78E-01	SCALING POT. TEMP. (Kelvin) -2.931E-02	WITH POT. TEMPERATURE (meter Kel./sec) 1.127E-02	WATER LAT. HEAT VAP. (Jcal./kg) 5.9024E+05
Z/L AT 10 METERS -0.027	SEN. HEAT FLUX (Watts/m2) 1.46E-01	ROUGHNESS LENGTH (meters) 1.951E-04		VAP. PRES. AT WT LEVEL (millibar) 15.539
MONTIN-ORUKHOV LENGTH (meters) -3.678E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAW. COEF. AT 10 METERS (Dimensionless) 1.327E-03		ABS. HUMID. AT WT LEVEL (kg/m3) 1.174E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E-02			BAR. PRES. AT WT LEVEL (millibar) 1013.91
	BOWEN RATIO (no. units) 0.143			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERRORS AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
105%	105%	86%	149%	79%	10%	115%	22%	4%	106%	3%	6%	65%
182%	182%	46%	42%	110%	1%	35%	150%	23%	65%	134%	4%	49%

\* CONTINUED BELOW

RUN NUMBER: 7905092030  
 START TIME: 21: 01: 0 PM  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE R. SPECIFIED MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN "+/-":

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.018 (-0.021 AT GHH)	MOMENTUM FLUX (Nt/m2) -2.27E-01 (1.0E-02)	FRICITION VELOCITY (meter/sec) 4.242E-01 (1.6E-02)
GEOMETRIC MEAN HEIGHT (meter) GHH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.92E-05 (1.8E-06)	SCALING PTFE HUMID. (kg/kg) -7.647E-05 (1.0E-05)
Z/L AT GHH -0.023 (-0.021)	LAT. HEAT FLUX (Watts/m2) 9.78E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.315E-02 (1.0E-02)
Z/L AT 10 METERS -0.018 (-0.021)	SEN. HEAT FLUX (Watts/m2) 1.361E-01 (3.0E+00)	ROUGHNESS LENGTH (meters) 3.092E-04 (1.6E-05)
MONTIN-ORUKHOV LENGTH (meters) -5.653E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E+01)	DRAW. COEF. AT 10 METERS (Dimensionless) 1.630E-03 (1.6E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.26E-02 (3.0E+01)	
	BOWEN RATIO (no. units) 0.140 (10.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STABILITY COVARIANCE FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABOVE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW. COEF.
41%	39%	29%	6%	3%	6%	6%	3%	14%	1%	19%	46%	1%

\* END OF DATA RUN

SOUTH AFRICAN INFORMATION  
 BUREAU AND POLICE - GERMANY  
 READING AIRCRAFT RESEARCH STATION  
 SAN NIKOLAS ISLAND - GERMANY

FILE NUMBER: 100-47466  
 BIRTH DATE: 11/29/01  
 MAR. 1961: 100-47466-100  
 MAR. 1961: 2 MAR 1961 (CAR 17)

PRINTED AT THE PRESS OF THE GOVERNMENT OF INDIA  
BY THE DIRECTOR, GOVERNMENT OF INDIA PRESS, NEW DELHI  
IN THE YEAR 1954

No. 10 WATERLOO 1895	No. 11 WATERLOO 1895	No. 12 WATERLOO 1895	No. 13 WATERLOO 1895	No. 14 WATERLOO 1895	No. 15 WATERLOO 1895	No. 16 WATERLOO 1895	No. 17 WATERLOO 1895	No. 18 WATERLOO 1895	No. 19 WATERLOO 1895
No. 20 WATERLOO 1895	No. 21 WATERLOO 1895	No. 22 WATERLOO 1895	No. 23 WATERLOO 1895	No. 24 WATERLOO 1895	No. 25 WATERLOO 1895	No. 26 WATERLOO 1895	No. 27 WATERLOO 1895	No. 28 WATERLOO 1895	No. 29 WATERLOO 1895

FIGURE 1. Effect of FIPV on the identification and isolation of the FIPV genome in the cell culture.

Year	Age	Location	Number of fish	Number of eggs	Number of larvae	Number of juveniles	Number of adults	Number of fish	Number of eggs	Number of larvae	Number of juveniles	Number of adults
1981	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1982	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1983	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1984	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1985	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1986	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1987	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1988	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1989	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1990	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1991	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1992	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1993	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1994	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1995	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1996	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1997	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1998	10-12	10-12	10	10	10	10	10	10	10	10	10	10
1999	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2000	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2001	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2002	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2003	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2004	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2005	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2006	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2007	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2008	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2009	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2010	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2011	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2012	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2013	10-12	10-12	10	10	10	10	10	10	10	10	10	10
2014	10-12	10-12										

Parameter	Unit	Value	Parameter	Unit	Value	Parameter	Unit	Value	Parameter	Unit	Value
$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001
$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001	$\alpha_{\text{H}} = 0.0001$	$\text{cm}^{-1}$	0.0001

Case	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12	Case 13	Case 14	Case 15	Case 16	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22	Case 23	Case 24	Case 25	Case 26	Case 27	Case 28	Case 29	Case 30	Case 31	Case 32	Case 33	Case 34	Case 35	Case 36	Case 37	Case 38	Case 39	Case 40	Case 41	Case 42	Case 43	Case 44	Case 45	Case 46	Case 47	Case 48	Case 49	Case 50	Case 51	Case 52	Case 53	Case 54	Case 55	Case 56	Case 57	Case 58	Case 59	Case 60	Case 61	Case 62	Case 63	Case 64	Case 65	Case 66	Case 67	Case 68	Case 69	Case 70	Case 71	Case 72	Case 73	Case 74	Case 75	Case 76	Case 77	Case 78	Case 79	Case 80	Case 81	Case 82	Case 83	Case 84	Case 85	Case 86	Case 87	Case 88	Case 89	Case 90	Case 91	Case 92	Case 93	Case 94	Case 95	Case 96	Case 97	Case 98	Case 99	Case 100
Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12	Case 13	Case 14	Case 15	Case 16	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22	Case 23	Case 24	Case 25	Case 26	Case 27	Case 28	Case 29	Case 30	Case 31	Case 32	Case 33	Case 34	Case 35	Case 36	Case 37	Case 38	Case 39	Case 40	Case 41	Case 42	Case 43	Case 44	Case 45	Case 46	Case 47	Case 48	Case 49	Case 50	Case 51	Case 52	Case 53	Case 54	Case 55	Case 56	Case 57	Case 58	Case 59	Case 60	Case 61	Case 62	Case 63	Case 64	Case 65	Case 66	Case 67	Case 68	Case 69	Case 70	Case 71	Case 72	Case 73	Case 74	Case 75	Case 76	Case 77	Case 78	Case 79	Case 80	Case 81	Case 82	Case 83	Case 84	Case 85	Case 86	Case 87	Case 88	Case 89	Case 90	Case 91	Case 92	Case 93	Case 94	Case 95	Case 96	Case 97	Case 98	Case 99	Case 100	

[illegible][illegible]

RUN NUMBER: 2905921dc  
 START TIME: 2020-06-15T11:00:00  
 START DATE: 2 May 1979 (YEAR 129)

[illegible]

1993). In the case of the *Phragmites* marsh, the *Phragmites* plants were cut back to the ground level in the fall of 1992. The *Phragmites* plants were cut back to the ground level in the fall of 1992. The *Phragmites* plants were cut back to the ground level in the fall of 1992.

STATION ID	STATION NAME	STATION CODE	STATION TYPE	STATION STATUS	STATION COMMENTS
STATION 1	STATION 1 NAME	STATION 1 CODE	STATION 1 TYPE	STATION 1 STATUS	STATION 1 COMMENTS
STATION 2	STATION 2 NAME	STATION 2 CODE	STATION 2 TYPE	STATION 2 STATUS	STATION 2 COMMENTS
STATION 3	STATION 3 NAME	STATION 3 CODE	STATION 3 TYPE	STATION 3 STATUS	STATION 3 COMMENTS
STATION 4	STATION 4 NAME	STATION 4 CODE	STATION 4 TYPE	STATION 4 STATUS	STATION 4 COMMENTS
STATION 5	STATION 5 NAME	STATION 5 CODE	STATION 5 TYPE	STATION 5 STATUS	STATION 5 COMMENTS
STATION 6	STATION 6 NAME	STATION 6 CODE	STATION 6 TYPE	STATION 6 STATUS	STATION 6 COMMENTS
STATION 7	STATION 7 NAME	STATION 7 CODE	STATION 7 TYPE	STATION 7 STATUS	STATION 7 COMMENTS
STATION 8	STATION 8 NAME	STATION 8 CODE	STATION 8 TYPE	STATION 8 STATUS	STATION 8 COMMENTS
STATION 9	STATION 9 NAME	STATION 9 CODE	STATION 9 TYPE	STATION 9 STATUS	STATION 9 COMMENTS
STATION 10	STATION 10 NAME	STATION 10 CODE	STATION 10 TYPE	STATION 10 STATUS	STATION 10 COMMENTS

LOCAL NAME	ACCELERATION	PROJECT NUMBER	PROJECT NUMBER	BULK TRANSFER	BULK TRANSFER
0.4	0.0000	0.0000	0.0000	0.0000	0.0000

primary limitation existed for measurement of Particle Slope and/or Partial Derivative  
formulation is executed by integration of:

1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 26

INTEL, ON THE

AIR DENSITY  
1.225 kg/m<sup>3</sup>  
1.225

G)K [P]U[ ]E M AT  
+ 11 at 89 601 )  
41' 1 32

WATER LAKE HALL, CALIF.  
CITY OF LOS ANGELES  
S. 1902-1903.

FILE DATE: 11 JUN 1980  
DATA SAMPLING RATE: 600 CHANNELS/SEC  
DATA AVERAGING PERIOD: 30 MIN

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040

[illegible][illegible][illegible]

\* MEASUREMENT ERROR ANALYSIS. THE PARAMETERS LISTED IN PERCENT MEAN ERROR ARE COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE THERMAL ERROR VALUES AND BOTTOM ROW ARE THE AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "Worst-Case".

Model	Size	Time	Accuracy	Loss	Throughput	Memory	Latency	Scalability	Flexibility	Reliability	Security	Compliance	Interoperability
Model A	100MB	10s	95%	0.01	1000 ops/s	1GB	10ms	10x	High	99.9%	GDPR	ISO 27001	Open API
Model B	200MB	20s	90%	0.02	500 ops/s	2GB	20ms	5x	Medium	99.5%	GDPR	ISO 27001	REST API
Model C	500MB	50s	85%	0.03	200 ops/s	5GB	50ms	2x	Low	99.0%	GDPR	ISO 27001	GraphQL

\*  $\text{C}_2\text{H}_5\text{COOH}$  (N) 1.0000 g. 100.00%

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PRINT DATE: 11 JUN 1966
DATA SAMPLING RATE: ALL CHANNELS 100 MIN
DATA AVERAGING PERIOD: 20 MIN

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4. The weight of each component is multiplied by the weight factor, weighted as a function of the above respective measurement errors. All the weighted values are then added, giving measurement an accuracy indicated in 1.1.

[illegible]

1. The following is a list of the names of the persons who have been identified as having been involved in the investigation of the case, together with the date of their identification and the name of the person who identified them. The names are listed in alphabetical order of the date of identification.

[illegible]

NSA/CSS REF ID: A66100  
 ATTENTION: Foreign Section  
 MARKING: ATTENTION: ATTENTION: STATION  
 SANITIZATION: LAC 10/10/10

Run Number : 0901091151  
Start Time : 11:56:20 PM  
End Time : 12:04:30 PM  
Start Date : 9 May 1977 (Day 1)

Journal of Management Education 34(1) 109-123  
 Copyright © 2010 Sage Publications  
 10.1177/0022032109358000  
 DOI: 10.1177/0022032109358000

[illegible][illegible][illegible][illegible][illegible]

FILE NUMBER: 7905022130  
 START TIME: 21:55:20 P-1  
 START DATE: 7 JUL 1979 (86C 127)

MAXINE MONTAGUE LAYNE  
NKE MICROELECTRONICS  
1466 NICHOLS, SUITE 201, CH

```

PRINT DATE: 11 JUN 1980
DATA NAME: LBL DATE: 06 JUN 1980 TIME: 0.00
DATA ADDRESS: 0000000000000000
INSTRUMENT ADDRESS: 0000000000000000

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STABILITY	FLUX PARAMETERS ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ )	SEMI-LOG PLOTS ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ )	PARTIAL DIFFERENTIALS ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ )	PROBABILITY CHECK WITH REGRESSION
GRAB RECHARGE RATE NUMBER ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 0.015	MAXIMUM FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 2.91E-01	DIFFUSION COEFFICIENT ( $\text{meters}^2/\text{sec}$ ) 4.45E-01	CONCENTRATION DEPTH ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	DEPTH-TIME CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
COEFFICIENT OF DETERMINATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.000	RELATIVE FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.80E-05	STANDARD TIME FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 6.52E-05	STANDARD TIME FLUX SLOPE ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	RECHARGE RATE CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.026	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 8.60E-01	STANDARD PORE TEMPERATURE ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 2.53E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.015	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-01	RELATIVITY LENGTH ( $\text{meters}$ ) 4.45E-04	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.014	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-01	DEGRADATION AT 10 M FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-05	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
GRAB RECHARGE RATE NUMBER ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 0.015	RELATIVE FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.80E-05	STANDARD PORE TEMPERATURE ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 2.53E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.026	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 8.60E-01	DEGRADATION AT 10 M FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-05	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.015	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-01	DEGRADATION AT 10 M FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-05	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02
Z/AI AT 0.00 0.014	LEFT HEAT FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-01	DEGRADATION AT 10 M FLUX ( $\text{kg/d}^2/\text{hr}/\text{m}^2$ ) 1.01E-05	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02	WATER HUMIDITY CORRELATION ( $\text{kg/d}^2/\text{hr}/\text{m}^2/\text{m}$ ) 1.01E-02

YON KARMAN	CALCULATE	PROJECT	PROJECT	PERK	BULK
CONSTANT	DIFFERENTIAL	THE PERIOD	THE PERIOD	SENIOR	POSTAGE
NO. OF	NO. OF	NUMBER	NUMBER	TRANS. COST	POSTAGE COST
0.0	0.0000	1.24	1.24	0.9000	1.3000

Accuracy limitation provided for measurement of Partial Slope and/or Partial Derivative  
Computation created by the action of

MISCELLANEOUS

AIR DENSITY  
(KG./M.<sup>3</sup>)  
1.297

AIR SPECIFIC HEAT  
Cp (kJ/kg K) 1.005  
2.410E+02

WATER LAT HEAT VAP.  
(BTU/LB/°F)  
5,913.21

RUN NUMBER: 7905092130  
 START TIME: 21:56:20 PST  
 START DATE: 9 May 1979 (Day 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPING RATE: 1011 CHANNELS 0.01 MIN  
 DATA AVERAGING PERIOD: 20 MIN

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	DEW POINT (Celsius)	TURB. STRU. (M111000)	BAR. PRES. (M111000)	SEA WT TEMP (Celsius)	AIR WT TEMP (Celsius)	POT WT TEMP (Celsius)	VIR WT TEMP (Celsius)	V. POT. WT TEMP (Celsius)
12.418	10.47	9.59	NO DATA	1012.75	13.573	1.155	1.057	6.143	6.261
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/M3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (M111000)	S. VAP. PRES. (M111000)	REF. HUMID. (Kg/M3)
10.33	12.516	13.696	13.794	9.05E-03	82.84	7.360E-03	11.950	14.431	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	ASSUMED MEAN
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.032 AT GSH	MOMENTUM FLUX (Nt/M2) -1.78E-01	FRICTION VELOCITY (Meters/sec) 3.805E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.448E-01	AIR DENSITY (Kg/M3) 1.2360
GEOMETRIC MEAN HEIGHT (Meter) GSH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec M2) 3.73E-05	SCALING SPEC. HUMID. (Kg/Kg) -7.970E-05	WITH ABS. HUMIDITY (Meter Kg/sec M3) 3.738E-05	AIR SPECIFIC HEAT (Jtcal /kg Kel) 2.415E+02
Z/L AT GSH -0.007	LAT. HEAT FLUX (Watts/M2) 9.22E-01	SCALING POT. TEMP. (Kelvin) -3.201E-02	WITH POT. TEMPERATURE (Meter Kel/sec) 1.210E-02	WATER LAT. HEAT CAP (Jtcal /kg) 5.902E+05
Z/L AT 10 METERS -0.030	SEN. HEAT FLUX (Watts/M2) 1.52E-01	ROUGHNESS LENGTH (Meters) 1.893E-04		VAP. PRES. AT WT LEVEL (M111000) 15.550
MONIN-ORUKHOV LENGTH (Meters) -3.296E-02	SKY AND SOLAR HEAT FLUX (Watts/M2) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 1.521E-03		ABS. HUMID. AT WT LEVEL (Kg/M3) 1.125E-02
	TOTAL HEAT BUDGET FLUX (Watts/M2) 1.22E-02			PAR. PRES. AT WT LEVEL (M111000) 1013.90
	ROUEN RATIO (no units) 0.164			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUTE MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE %.

GRAD. RICH. NO. AT GSH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROUEN RATIO	FRICTION VELOCITY	SC. SPEC. HUMIDITY	SC. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
103%	113%	81%	156%	75%	18%	11%	29%	44%	16%	31%	64%	8%
177%	177%	46%	43%	195%	19%	1%	14%	23%	6%	10%	40%	4%

\* CONTINUED BELOW

RUN NUMBER: 7905092130  
 START TIME: 21:56:20 PST  
 START DATE: 9 May 1979 (Day 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPING RATE: 1011 CHANNELS 0.01 MIN  
 DATA AVERAGING PERIOD: 20 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.021 (0.02) AT GSH	MOMENTUM FLUX (Nt/M2) -2.17E-01 (1.6E-02)	FRICTION VELOCITY (Meters/sec) 4.167E-01 (6.6E-02)
GEOMETRIC MEAN HEIGHT (Meter) GSH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec M2) 3.22E-05 (1.6E-06)	SCALING SPEC. HUMID. (Kg/Kg) 7.417E-05 (3.3E-06)
Z/L AT GSH 0.007 (0.00)	LAT. HEAT FLUX (Watts/M2) 9.31E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.652E-02 (2.0E-02)
Z/L AT 10 METERS 0.021 (0.02)	SEN. HEAT FLUX (Watts/M2) 1.52E-01 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.893E-04 (6.0E-05)
MONIN-ORUKHOV LENGTH (Meters) 4.810E-02	SKY AND SOLAR HEAT FLUX (Watts/M2) 1.46E-01 (2.0E+01)	DRAW COEFF. AT 10 METERS (Meters) 1.507E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/M2) 1.22E-02 (3.0E+01)	
	ROUEN RATIO (no units) 0.162 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE AS QUANTIFIED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE %.

GRAD. RICH. NO. AT GSH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROUEN RATIO	FRICTION VELOCITY	SC. SPEC. HUMIDITY	SC. POT. TEMP.	ROUGH. LENGTH	DRAW COEFF.
39%	38%	27%	3%	0%	0%	2%	0%	13%	10%	15%	44%	5%

## MARINE SURFACE LAYER METEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
PACIFIC ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

K A A A METEOROLOGICAL DATA K A A A

EXPERIMENT: MARINE SURFACE LAYER  
STATION: SAN NICOLAS ISLAND  
DATE: 11 JUN 1966  
TIME: 0000Z

PRINT DATE: 11 JUN 1966  
DATA SAMPLING RATE: ONE CHANNEL/SEC/60 MIN  
DATA AVERAGING PERIOD: 20 MIN  
NO. OF AVERAGES: 100 PER LEVEL, 20 PER LEVEL

MARINE SURFACE LAYER METEOROLOGICAL DATA

NO. 01 TIME	NO. 02 DATE	NO. 03 TIME	NO. 04 TIME	NO. 05 TIME	NO. 06 TIME	NO. 07 TIME	NO. 08 TIME	NO. 09 TIME
0000	11 JUN 66	0000	0000	0000	0000	0000	0000	0000

MARINE SURFACE LAYER METEOROLOGICAL DATA - WIND SPEED CORRECTIONS

NO. 10 WIND SPEED	NO. 11 WIND SPEED	NO. 12 WIND SPEED	NO. 13 WIND SPEED	NO. 14 WIND SPEED	NO. 15 WIND SPEED	NO. 16 WIND SPEED	NO. 17 WIND SPEED	NO. 18 WIND SPEED
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MARINE SURFACE LAYER METEOROLOGICAL DATA - TEMPERATURE CORRECTIONS

NO. 19 TEMPERATURE	NO. 20 TEMPERATURE	NO. 21 TEMPERATURE	NO. 22 TEMPERATURE	NO. 23 TEMPERATURE	NO. 24 TEMPERATURE	NO. 25 TEMPERATURE	NO. 26 TEMPERATURE	NO. 27 TEMPERATURE
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MARINE SURFACE LAYER METEOROLOGICAL DATA - WIND DIRECTION CORRECTIONS

NO. 28 WIND DIRECTION	NO. 29 WIND DIRECTION	NO. 30 WIND DIRECTION	NO. 31 WIND DIRECTION	NO. 32 WIND DIRECTION	NO. 33 WIND DIRECTION	NO. 34 WIND DIRECTION	NO. 35 WIND DIRECTION	NO. 36 WIND DIRECTION
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MARINE SURFACE LAYER METEOROLOGICAL DATA - PRESSURE CORRECTIONS

NO. 37 PRESSURE	NO. 38 PRESSURE	NO. 39 PRESSURE	NO. 40 PRESSURE	NO. 41 PRESSURE	NO. 42 PRESSURE	NO. 43 PRESSURE	NO. 44 PRESSURE	NO. 45 PRESSURE
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MARINE SURFACE LAYER

EXPERIMENT: MARINE SURFACE LAYER  
STATION: SAN NICOLAS ISLAND  
DATE: 11 JUN 1966  
TIME: 0000Z

PACIFIC ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1966  
DATA SAMPLING RATE: ONE CHANNEL/SEC/60 MIN  
DATA AVERAGING PERIOD: 20 MIN  
NO. OF AVERAGES: 100 PER LEVEL, 20 PER LEVEL

MARINE SURFACE LAYER METEOROLOGICAL DATA - DERIVED AND CALCULATED VALUES (CRIPINGER, 1973)

NO. 46 TEMPERATURE	NO. 47 TEMPERATURE	NO. 48 TEMPERATURE	NO. 49 TEMPERATURE	NO. 50 TEMPERATURE	NO. 51 TEMPERATURE	NO. 52 TEMPERATURE	NO. 53 TEMPERATURE	NO. 54 TEMPERATURE
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MARINE SURFACE LAYER

EXPERIMENT: MARINE SURFACE LAYER  
STATION: SAN NICOLAS ISLAND  
DATE: 11 JUN 1966  
TIME: 0000Z

PACIFIC ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1966  
DATA SAMPLING RATE: ONE CHANNEL/SEC/60 MIN  
DATA AVERAGING PERIOD: 20 MIN  
NO. OF AVERAGES: 100 PER LEVEL, 20 PER LEVEL

MARINE SURFACE LAYER METEOROLOGICAL DATA - DERIVED AND CALCULATED VALUES (CRIPINGER, 1973)

NO. 55 TEMPERATURE	NO. 56 TEMPERATURE	NO. 57 TEMPERATURE	NO. 58 TEMPERATURE	NO. 59 TEMPERATURE	NO. 60 TEMPERATURE	NO. 61 TEMPERATURE	NO. 62 TEMPERATURE	NO. 63 TEMPERATURE
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

RUN NUMBER: 7905092200  
 START TIME: 20:24:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 62/min  
 DATA AVERAGING PERIOD: 28 min

\* ESTIMATED METEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.464	WIND SPEED (meter/sec) 9.39	DEW POINT (Celsius) 9.55	TEMP. STRUC. (Kelvin 2/3) NO DATA	BAR. PRES. (millibar) 1012.88	BULK WT TEMP. (Celsius) 13.588	AIR WT TEMP. (Kelvin) -1.116	POT. WT TEMP. (Kelvin) 1.018	WTR WT TEMP. (Kelvin) 8.159	V. POT. WT TEMP. (Kelvin) 8.159
HEIGHT (meters) 10.00	POT. TEMP. (Celsius) 12.062	WTR TEMP. (Celsius) 13.749	V. POT. TEMP. (Celsius) 13.837	ABS. HUMID. (kg/m3) 9.027E-03	REL. HUMID. (Percent) 82.37	SPCL. HUMID. (kg/kg) 7.140E-03	VAP. PRES. (millibar) 11.659	S. VAP. PRES. (millibar) 14.446	REF. INDEX (Kelvin 2/3) NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRITH ET AL, 1976):

INFERRED STABILITY	FLUX PARAMETERS (+UP, +DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	APPROXIMATE
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.043 AT 6M	MOMENTUM FLUX (Nt/m2) -1.35E-01	FRICITION VELOCITY (meter/sec) 3.319E-01	WITH LONG. VELOCITY (meter2/sec2) -1.101E-01	AIR DENSITY (kg/m3) 1.2290
LOG. TRIC. MEAN HEIGHT (meter) GMD=(Z1*Z2)1/2 12.97	HUMIDITY FLUX (kg/sec m2) 3.38E-05	SCALING SPEC. HUMID. (kg/kg) -8.290E-05	WITH ABS. HUMIDITY (meter kg/sec m3) 3.38E-05	WTR SPECIFIC HEAT (J/cal /kg kel.) 2.419E+02
Z/L AT 6M -0.053	LAT. HEAT FLUX (Watts/m2) 8.36E-01	SCALING POT. TEMP. (Kelvin) -3.251E-02	WITH POT. TEMPERATURE (meter kel./sec) 1.079E-02	WATER LAT. HEAT VAP. (J/cal /kg) 5.9626E+05
Z/L AT 10 METERS -0.040	SEN. HEAT FLUX (Watts/m2) 1.34E-01	ROUGHNESS LENGTH (meter) 1.159E-04		VAP. PRES. AT WT LEVEL (millibar) 15.558
MONIN-ORUKHOV LENGTH (meter) -2.469E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.256E-03		ABS. HUMID. AT WT LEVEL (kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.12E-02			BAR. PRES. AT WT LEVEL (millibar) 1014.29
	BOWEN RATIO (no units) 0.161			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROXIMATE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "x100".

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
10%	10%	8%	14%	7%	10%	11%	20%	4%	16%	3%	6%	6%
17%	17%	4%	4%	10%	10%	3%	15%	2%	6%	13%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905092200  
 START TIME: 20:24:40 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 62/min  
 DATA AVERAGING PERIOD: 28 min

\* CORRECTED PROXIMATE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS.

STABILITY	FLUX PARAMETERS (+UP, +DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.025 (-0.02) AT 6M	MOMENTUM FLUX (Nt/m2) -1.62E-01 (1.60E-02)	FRICITION VELOCITY (meter/sec) 3.792E-01 (1.60E-02)
LOG. TRIC. MEAN HEIGHT (meter) GMD=(Z1*Z2)1/2 12.97	HUMIDITY FLUX (kg/sec m2) 3.40E-05 (1.80E-06)	SCALING SPEC. HUMID. (kg/kg) 7.611E-05 (3.0E-05)
Z/L AT 6M -0.031 (-0.02)	LAT. HEAT FLUX (Watts/m2) 8.56E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.402E-02 (2.0E-02)
Z/L AT 10 METERS -0.024 (-0.02)	SEN. HEAT FLUX (Watts/m2) 1.35E-01 (3.0E+01)	ROUGHNESS LENGTH (meter) 2.246E-04 (1.60E-05)
MONIN-ORUKHOV LENGTH (meter) -4.135E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E+01)	DRAG COEF. AT 10 METERS (Dimensionless) 1.08E-03 (1.4E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.14E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.154 (0.08)	

\* DIFFERENCE BETWEEN THE PROXIMATE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EACH ONE. ABOVE WEIGHTED CORRECTED VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABOVEMENTIONED VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "x100".

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICITION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH LENGTH	DRAG COEF.
5%	5%	1%	6%	1%	6%	4%	6%	10%	1%	2%	60%	4%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905092336  
START TIME: 02:53:00 PST  
END TIME: 23:26:50 PST  
START DATE: 9 May 1972 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNELS: 02min  
DATA AVERAGING PERIOD: 20 min  
CORRECTIONS: 1-UPPER LEVEL, 2-DOWN LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VBC):

No. 06	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOL. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	WIND SPEED 3	WIND SPEED 4	WIND SPEED 5
6.205	6.000	6.001	4.989	5.054	5.043	5.039	4.296	6.135	5.029
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK W. TEMP.	AL. FREQUENCY	AL. VOL. TIME	WINDY FLAG	WINDY REF.	WINDY A	WINDY B	WINDY C	WINDY D	WINDY E
3.933	3.826	2.546	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND THERMISTOR APPARENT CORRECTIONS

No. 1	No. 2	UPWIND NEAR	UPWIND FARD	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND	DOWNWIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)	HEIGHT/LENGTH PATH (meters)
1411.124330	1421.125339	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

BULK W. TEMP.	WINDY FLAG	DATA DATE	WINDY REF.	WINDY A	WINDY B	WINDY C	WINDY D	WINDY E	WINDY F
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	168	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE COR. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	WIND PRESS. 1	WIND PRESS. 2	WIND PRESS. 3	WIND PRESS. 4	WIND PRESS. 5
(Celsius)	(meters/sec)	(Celsius)	(Celsius/2/3)	(deg. Ince)	(millibar)	(millibar)	(millibar)	(millibar)	(millibar)
12.433	13.17	9.45	NO DATA	52.9	1011.78	1011.78	1011.78	1011.78	1011.78
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	WIND DIR. 2	WIND PRESS. 2	WIND PRESS. 3	WIND PRESS. 4	WIND PRESS. 5	WIND PRESS. 6
(Celsius)	(meters/sec)	(Celsius)	(Celsius/2/3)	(deg. Ince)	(millibar)	(millibar)	(millibar)	(millibar)	(millibar)
12.534	9.39	9.50	NO DATA	50.0	1012.03	1012.03	1012.03	1012.03	1012.03

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	WIND TEMP. 1	W. POT. TEMP. 1	REL. HUMID. 1	REL. HUMID. 2	SPEC. HUMID. 1	WIND PRESS. 1	WIND PRESS. 2	WIND PRESS. 3
(meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Percent)	(kg/kg)	(millibar)	(millibar)	(millibar)
10.35	12.613	13.697	13.697	8.961E-03	82.06	7.27E-03	11.810	14.392	NO DATA
HEIGHT, Z2	POT. TEMP. 2	WIND TEMP. 2	W. POT. TEMP. 2	REL. HUMID. 2	REL. HUMID. 3	SPEC. HUMID. 2	WIND PRESS. 2	WIND PRESS. 3	WIND PRESS. 4
(meters)	(Celsius)	(Celsius)	(Celsius)	(Percent)	(Percent)	(kg/kg)	(millibar)	(millibar)	(millibar)
7.39	12.624	13.805	13.805	8.990E-03	81.75	7.31E-03	11.864	14.513	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905092336  
START TIME: 02:53:00 PST  
START DATE: 9 May 1972 (DAY 129)

MARINE SURFACE LAYER  
NRL MICROMETEOR. STN  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: CALL CHANNELS: 02min  
DATA AVERAGING PERIOD: 20 min  
CORRECTIONS: 1-UPPER LEVEL, 2-DOWN LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (CRISTOFER, 1973):

STABILITY	FLUX PARAMETERS (UP, DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (WITH H. 10-1)
UNAD. RICHARDSON NUMBER (-Stable, -Unstable) -0.010 AT 0.01	MINIMUM FLUX (W/m <sup>2</sup> ) 2.84E-01	FRICTION VELOCITY (meters/sec) 4.805E-01	GENERAL FORM: DN/DZ (N1-N2)/1/(N1/Z1/Z2)* (Z1/Z2)/1/Z1	GENERAL FORM: NSLOPES (1/(N1-Z1)-1/(N2-Z2))/1/(N1-Z1)
QUADRATIC REF. HEIGHT (Meter) CHN=(Z1*Z2)/1/2 12.29	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 3.91E-05	COILING SPEC. HUMID. (kg/kg) 6.444E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ= 8.82E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI2 WS SLOPE= 8.32E-01
Z/L AT 0.01	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 9.41E-01	SCALING POT. TEMP. (Kelvin) -1.709E-02	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (Meters) DSH/DZ= -8.92E-06	N-SPEC. HUMIDITY (kg/kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE= -8.32E-03
Z/L AT 10 METERS -0.010	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 1.02E-01	ROUGHNESS LENGTH (Meters) 4.208E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ= -7.35E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis POT=PSI2 POT SLOPE= 3.14E-01
Z/L AT Z1 -0.012	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.46E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.675E-03	N-TEMP. STRUCT. (K/m 2/3) Z-HEIGHT (M) Vert. Axis PSI=PSI2 C12 SLOPE=NO DATA	
Z/L AT Z2 -0.010	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.19E-01			
MINIMUM DEGREE LENGTH (Meters) -9.606E-02	HUMID. RATIO (No. units) 0.118			
PSI1 AT Z1= 0.066602 PSI2 AT Z2= 0.034400 PSI2 AT Z1= 0.040446 PSI2 AT Z2= 0.020083				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No. units) <th>GRAVITATION ACCELERATION (m/sec<sup>2</sup>) <th>PRANDTL NUMBER <th>PRANDTL NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MIXTURE TRANSF. COEFF. </th></th></th></th></th>	GRAVITATION ACCELERATION (m/sec <sup>2</sup> ) <th>PRANDTL NUMBER <th>PRANDTL NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MIXTURE TRANSF. COEFF. </th></th></th></th>	PRANDTL NUMBER <th>PRANDTL NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MIXTURE TRANSF. COEFF. </th></th></th>	PRANDTL NUMBER <th>BULK SEN. HEAT TRANSF. COEFF. <th>BULK MIXTURE TRANSF. COEFF. </th></th>	BULK SEN. HEAT TRANSF. COEFF. <th>BULK MIXTURE TRANSF. COEFF. </th>	BULK MIXTURE TRANSF. COEFF.
0.4	9.7959	0.74	0.74	6.92E-03	1.32E-04

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivatives.  
Computation executed by conversion of:

SHI SLOPE= 4.7E-01, LSH= 3.9E-01

## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2293

AIR SPECIFIC HEAT  
(J/kg K)  
2.41E-02

WATER LAT. HEAT CAP  
(J/kg K)  
5.926E-01

## \* CONTINUED ON NEXT PAGE



RUN NUMBER: 790509230  
 START TIME: 22:53: 0 PST  
 START DATE: 9 May 1979 (DAY 12)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: (ALL CHANNELS) 4/min  
 DATA AVERAGING PERIOD: 24 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m/2/3)	BAR PRESS. (millibars)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V-POT-WT TEMP. (Kelvin)
12.520	9.47	9.50	NO DATA	1012.79	13.527	-1.057	-0.959	0.214	0.311
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ARS. HUMID. (kg/m3)	REL. HUMID. (Percent)	PREC. HUMID. (kg/m3)	VAP. PRES. (millibars)	S. VAP. PRES. (millibars)	POT. INCL. (Kelvin-m/2/3)
10.00	12.610	13.791	13.659	8.991E-03	81.78	5.01E-03	11.000	14.499	60.161

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRICHE ET AL, 1975):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	FLUX CALCULATION
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.040 AT GHM	MOMENTUM FLUX (Nt/m2) -1.39E-01	FRICTION VELOCITY (Meter/sec) 3.357E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.127E-01	AIR DENSITY (kg/m3) 1.2295
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.45E-05	SCALING SPEC. HUMID. (kg/kg) -8.364E-05	WITH ARS. HUMIDITY (Meter kg/sec m3) 3.452E-05	AIR SPECIFIC HEAT (Jtcal/kg) 2.417E+02
Z/L AT GHM -0.047	LAT. HEAT FLUX (Watts/m2) 8.53E-01	SCALING POT. TEMP. (Kelvin) -3.885E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 1.034E-02	WATER LAT. HEAT VAP. (Jtcal/kg) 5.902E+05
Z/L AT 10 METERS 0.038	SEN. HEAT FLUX (Watts/m2) 1.29E-01	ROUGHNESS LENGTH (Meter) 1.207E-04		VAP. PRES. AT WT LEVEL (millibar) 15.555
MONIN-OBUKHOV LENGTH (Meters) -2.663E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01	DRAG COEF. AT 10 METERS (Dimensionless) 1.255E-03		AES. HUMID. AT WT LEVEL (kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.13E-02			BAR PRES. AT WT LEVEL (millibar) 1013.99
	BOWEN RATIO (no units) 0.151			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-" %.

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH- LENGTH	DRAG COEF.
107%	167%	81%	146%	84%	10%	116%	230%	40%	116%	4%	60%	0%
102%	102%	46%	42%	110%	10%	35%	153%	24%	60%	15%	43%	4%

\* CONTINUED BELOW

RUN NUMBER: 790509230  
 START TIME: 22:53: 0 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE: (ALL CHANNELS) 4/min  
 DATA AVERAGING PERIOD: 24 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN P. 1:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.021 (0.02) AT GHM	MOMENTUM FLUX (Nt/m2) -1.91E-01 (1.60E-02)	FRICTION VELOCITY (Meter/sec) 3.883E-01 (1.60E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHM=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (kg/sec m2) 3.03E-05 (8.0E-06)	SCALING SPEC. HUMID. (kg/kg) -7.630E-05 (13.0E-05)
Z/L AT GHM -0.027 (0.02)	LAT. HEAT FLUX (Watts/m2) 8.73E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.047E-02 (2.0E-02)
Z/L AT 10 METERS 0.020 (0.02)	SEN. HEAT FLUX (Watts/m2) 1.14E-01 (1.0E+00)	ROUGHNESS LENGTH (Meter) 2.456E-04 (1.60E-05)
MONIN-OBUKHOV LENGTH (Meters) -4.891E-02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E-01 (2.0E+01)	DRAG COEF. AT 10 METERS (Dimensionless) 1.276E-03 (1.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.14E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.134 (1.00)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FORMULA FROM THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABOVE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-" %.

GRAD. RICH. NO. AT GHM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH- LENGTH	DRAG COEF.
21%	69%	39%	6%	12%	0%	1%	14%	19%	13%	5%	7%	4%

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN DIEGO, CALIFORNIA

1998, 1999, 2000, 2001, 2002  
 1991, 1992, 1993, 1994, 1995  
 1996, 1997, 1998, 1999, 2000  
 1991, 1992, 1993, 1994, 1995

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PRINT DATE      11 JUN 1983
DATA SMOOTHING RATE (CALL CHANNELS): 67Min
DATA AVERAGING PERIOD: 28 Min
NUMERICALURE, 1 UPPER LEVEL, 2 LOWER LEVEL

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No. 01 FAN SPEED 0.000	No. 02 FAN MOTOR 0.000	No. 03 FAN MOTOR 0.000	No. 04 FAN MOTOR 0.000	No. 05 FAN MOTOR 0.000	No. 06 FAN MOTOR 0.000	No. 07 FAN MOTOR 0.000	No. 08 FAN MOTOR 0.000	No. 09 FAN MOTOR 0.000
No. 10 FAN MOTOR 0.000	No. 11 FAN MOTOR 0.000	No. 12 FAN MOTOR 0.000	No. 13 FAN MOTOR 0.000	No. 14 FAN MOTOR 0.000	No. 15 FAN MOTOR 0.000	No. 16 FAN MOTOR 0.000	No. 17 FAN MOTOR 0.000	No. 18 FAN MOTOR 0.000

## ESCARPMENT DATA FIELD LOCATION AND WIND SPEED ESCARPMENT CORRECTIONS

Year	Year	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH	UPPER MOUTH
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

[illegible]

FILE NAME	WIND SPEED (m/s)	WIND DIRECTION (Degrees)	WIND GUST (m/s)	WIND DIR. (Degrees)	WIND GUST (m/s)	BAR PRESS. (millibars)	AIR TEMP. (Celsius)	REL. HUMID. (Percent)	BAR PRESS. (millibars)	AIR TEMP. (Celsius)	REL. HUMID. (Percent)
10000001	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000002	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000003	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000004	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000005	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000006	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000007	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000008	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000009	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000010	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000011	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000012	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000013	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000014	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000015	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000016	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000017	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000018	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000019	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000020	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000021	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000022	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000023	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000024	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000025	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000026	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000027	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000028	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000029	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85
10000030	1.0	270	1.0	270	1.0	1013.25	15.56	85	1013.25	15.56	85

[illegible]

FILE NAME: 77-507-100  
 START TIME: 25:21:00 PM  
 START DATE: 2 MAR 1977 (REF 159)

MARINE SURFACE LAYER  
AND MICRONEUTRALITY  
SAN NICOLAS ISLAND, C.C.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67Mhz  
DATA AVERAGING PERIOD: 28 Min  
CUMULATIVE: UPPER LEVEL 2, LOWER LEVEL 1

Variable	FLUX PARAMETERS (Watts/m <sup>2</sup> or Down)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+/- INCR. WITH HEIGHT)
DOWNWARD HEAT FLUX (Watts/m <sup>2</sup> ) -0.42E+01	HORIZONTAL FLUX (Watts/m <sup>2</sup> ) -2.42E+01	FRICTION VELOCITY (Meters/sec) 4.43E-01	GENERAL FORM: DW/DZ = 1/(N1+1)/(1+(Z1/Z2)** (21*Z2)/(1+Z1))	GENERAL FORM: N SLOPE = 1/(1+(Z1/Z2)**(21*Z2)/(1+Z1))
HORIZONTAL HEAT FLUX (Watts/m <sup>2</sup> ) -2.42E+01	HORIZONTAL FLUX (Watts/m <sup>2</sup> ) -2.42E+01	SCALING SPEC. HUMID. (Kg/Kg) 6.55E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DW/DZ = -7.95E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 9.02E-01
Z-HEIGHT (Meters) -0.00E+00	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 8.79E-01	SCALING POT. TEMP. (Kelvin) -2.08E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = -8.29E-03
Z-HEIGHT (Meters) -0.00E+00	SKY HEAT FLUX (Watts/m <sup>2</sup> ) 1.15E-01	ROUGHNESS LENGTH (Meters) 3.199E-04	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DP/DZ = -2.86E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = -2.59E-01
Z-HEIGHT (Meters) -0.00E+00	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.45E-01	BRAD. COEFF. AT 10 METERS (Dimensionless) 2.95E-03		N-TEMP. STRUCT. (Kmh-2/3) Z-HEIGHT (M) Vert. Axis PS1=NON. CTD SLOPE=NO DATA
DOWNWARD HEAT FLUX (Watts/m <sup>2</sup> ) -0.42E+01	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 1.14E-02			
PS11 AT Z1 = 1.0E+01.4	POWER RATIO			
PS11 AT Z2 = 1.0E+01.62	DOWNWARD FLUX			
PS12 AT Z1 = 1.0E+01.467				
PS12 AT Z2 = 1.0E+01.62				

### MISCELLANEOUS

WIND SPEED	ACCELERATION	WIND DIR.	PROFILE	RURK	RURK
CONSTANT	ACCELERATION	FOR PAVING	100% HUMID	SUN H. AT	MOISTURE
100% HUMID	ACCEL.	ANGLE	NUMBER	TRANS. COEF.	TRANS. COEF.
1.4	2.29-2.2	6.74	1.74	6.92-6.3	1.35-0.3

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.2296

AIR SPECIFIC HEAT  
(cal/kg K)  
2.415E+02

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

544 S. L. L. Lau, J. H. S. Luk and S. Y. Ho

WATER LAT. HEAT CAP  
(ITcal/kg)  
5 9027E US

RUN NUMBER: 7905092300  
 START TIME: 05:21:00 PST  
 START DATE: 9 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRE MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (meter/sec)	Dew POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT-WT TEMP. (Kelvin)	VIR-WT TEMP. (Kelvin)	V.POT-WT TEMP. (Kelvin)
12.490	8.41	9.62	NO DATA	1012.90	13.568	-1.078	-6.980	0.203	0.361

HEIGHT (meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (millibars)	S. VAP. PRES. (millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.588	13.771	13.869	9.070E-03	62.63	7.375E-03	11.957	14.472	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.059 AT 0M	MOMENTUM FLUX (N/m2) -1.03E-01	FRICTION VELOCITY (meter/sec) 2.894E-01	WITH LONG. VELOCITY (meter2/sec2) -8.375E-02	AIR DENSITY (Kg/m3) 1.2298
GEOMETRIC MEAN HEIGHT (meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 2.97E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.354E-05	WITH ABS. HUMIDITY (meter Kg/sec m3) 2.973E-05	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.4159E 02
Z/L AT GMH -0.070	LAT. HEAT FLUX (Watts/m2) 7.35E 01	SCALING POT. TEMP. (Kelvin) -3.311E-02	WITH POT. TEMPERATURE (meter Kel./sec) 9.582E-03	WATK LAT. HEAT VAP. (Jcal./Kg) 5.9025E 05
Z/L AT 10 METERS 0.054	SEN. HEAT FLUX (Watts/m2) 1.19E 01	ROUGHNESS LENGTH (meters) 7.038E-05		VAP. PRES. AT WT LEVEL (millibar) 15.548
MONIN-ORJANOV LENGTH (meters) -1.844E 02	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01	DRAG COEF. AT 10 METERS (Dimensionless) 1.185E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.00E 02			BAR. PRES. AT WT LEVEL (millibar) 1014.10
	DOWN RATIO (no units) 0.162			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PREVIOUS MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE PROVIDED ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "BEST":

GRAD. RICH. NO. AT 0M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
99%	99%	79%	145%	76%	10%	112%	221%	39%	105%	37%	59%	79%
101%	101%	44%	43%	109%	10%	34%	152%	23%	64%	132%	43%	40%

\* CONTINUING BELOW

RUN NUMBER: 7905092300  
 START TIME: 05:21:00 PST  
 START DATE: 9 May 1979 (DAY 127)

MARINE SURFACE LAYER  
 NRE MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 Min

\* CORRECTED PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.031 (0.007) AT 0M	MOMENTUM FLUX (N/m2) -1.50E-01 (1.6E-02)	FRICTION VELOCITY (meter/sec) 3.452E-01 (1.6E-02)
GEOMETRIC MEAN HEIGHT (meter) GMH-(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 3.11E-05 (1.8E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.642E-05 (3.0E-05)
Z/L AT GMH -0.038 (1.0E-02)	LAT. HEAT FLUX (Watts/m2) 7.68E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) 2.354E-02 (2.0E-02)
Z/L AT 10 METERS 0.029 (1.0E-02)	SEN. HEAT FLUX (Watts/m2) 1.17E 01 (3.0E+00)	ROUGHNESS LENGTH (meters) 1.752E-04 (1.6E-05)
MONIN-ORJANOV LENGTH (meters) 3.45E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.46E 01 (2.0E+01)	DRAG COEF. AT 10 METERS (meters) 1.07E-04 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 1.00E 02 (3.0E+01)	
	DOWN RATIO (no units) 0.153 (0.01)	

\* CORRECTED PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE MEASUREMENTS OR THE CORRESPONDING MEASUREMENT UNCERTAINTY (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "BEST":

GRAD. RICH. NO. AT 0M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
74%	76%	41%	11%	22%	6%	82%	11%	23%	10%	30%	72%	54%

## MARINE SURFACE LAYER MICROTECHNOLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* ATMOSPHERIC DATA \* \* \* \* \*

RUN NUMBER: 2905092330  
START TIME: 23:49:10 PST  
END TIME: 01:12:06 PST  
START DATE: 9 May 1972 (DAY 129)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: ONE THIRTIETH OF MIN  
DATA AVERAGING PERIOD: 20 MIN  
NUMERATURES: 1-TOPPER LEVEL, 2-BLOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (CHECKED):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
WIND SPEED A	WIND SPEED B	WIND SPEED C	WIND SPEED D	WIND SPEED E	WIND SPEED F	WIND SPEED G	WIND SPEED H	WIND SPEED I	WIND SPEED J
6.265	6.000	6.000	5.956	5.957	5.962	5.972	5.985	5.985	5.985
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT TEMP	AIR FREQUENCY	AIR FREQUENCY	WIND FLUX	WIND FLUX	WIND FLUX	WIND FLUX	WIND FLUX	WIND FLUX	WIND FLUX
5.925	5.916	5.916	5.911	5.911	5.911	5.911	5.911	5.911	5.911

## \* DIGITAL CHANNEL RAW DATA (CHECKED): EXAMINE DATA FOR CALIBRATION AND WIND SPEED INTERFERENT CORRECTIONS

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
AIR TEMP 1	AIR TEMP 2	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED	WIND SPEED
14.1125125	14.0112405	14.0112405	14.0112405	14.0112405	14.0112405	14.0112405	14.0112405	14.0112405	14.0112405

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS

PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE	PARAMETER	UNIT	VALUE
WIND FLUX	(Watts/m <sup>2</sup> )	0.000	WIND FLUX	(Watts/m <sup>2</sup> )	0.000	WIND FLUX	(Watts/m <sup>2</sup> )	0.000
WIND FLUX	(Watts/m <sup>2</sup> )	0.000	WIND FLUX	(Watts/m <sup>2</sup> )	0.000	WIND FLUX	(Watts/m <sup>2</sup> )	0.000

## \* DISK FILE MICROTECHNOLOGICAL PARAMETERS CORRESPONDING TO DATA ON ANALOG CHANNEL TRANSLATED INTO ENGINEERING UNITS

WIND SPEED 1	WIND SPEED 2	WIND SPEED 3	WIND SPEED 4	WIND SPEED 5	WIND SPEED 6	WIND SPEED 7	WIND SPEED 8	WIND SPEED 9	WIND SPEED 10
(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)
12.410	12.410	12.410	12.410	12.410	12.410	12.410	12.410	12.410	12.410

## \* CALCULATED MICROTECHNOLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	WIND TEMP. 1	POT. TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1	WIND TEMP. 1
(meters)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)	(Celsius)
10.53	12.492	12.492	12.492	12.492	12.492	12.492	12.492	12.492	12.492

## \* CONTINUED BELOW

RUN NUMBER: 2905092330  
START TIME: 23:49:10 PST  
START DATE: 9 May 1972 (DAY 129)

MARINE SURFACE LAYER  
MRL MICROTECHNOLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: ONE THIRTIETH OF MIN  
DATA AVERAGING PERIOD: 20 MIN  
NUMERATURES: 1-TOPPER LEVEL, 2-BLOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON OBSERVED AND CALCULATED VALUES (BUSINESS, 1973):

STABILITY	FLUX PARAMETERS (UP, -DOWN)	SLANTING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPE (1/1000) WITH HEIGHT
GRADIENT RICHARDSON NUMBER (C-Stable, C-Unstable) 0.021 AT GMM	MOMENTUM FLUX (N/m <sup>2</sup> ) 5.67E-02	FRITTED VELOCITY (meters/sec) 2.148E-01	GENERAL FORM DNDZ (1/1000) 1/1000 21/22 (21/22) 21/21	GENERAL FORM ON SCALE (1/1000) 1/1000 21/22 (21/22) 21/21
GRADIENT RICHARDSON NUMBER (C-Stable, C-Unstable) 0.021 AT GMM	MOISTURE FLUX (kg/m <sup>2</sup> ) 1.75E-05	SLANTING SPEED (m/sec) 6.637E-05	N-WIND SPEED (m/sec) 3.79E-02	N-WIND SPEED (m/sec) 3.79E-02
Z/L AT GMM 0.027	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.31E-01	SLANTING POT. TEMP. (Kelvin) 6.607E-03	N-SPEC HUMIDITY (kg/kg) 7.50E-03	N-SPEC HUMIDITY (kg/kg) 7.50E-03
Z/L AT 10 METERS 0.021	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 1.77E-00	ROUGHNESS LENGTH (meters) 2.145E-05	N-POT. TEMP. (Kelvin) 7.50E-03	N-POT. TEMP. (Kelvin) 7.50E-03
Z/L AT 21 0.014	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.48E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 6.42E-05	N-HEIGHT (meters) 8.92E-04	N-HEIGHT (meters) 8.92E-04
Z/L AT 72 0.019	TOTAL HEAT RUGGHT FLUX (Watts/m <sup>2</sup> ) 5.97E-01		N-TEMP. (Kelvin) 8.92E-04	N-TEMP. (Kelvin) 8.92E-04
ROUNDOFF LENGTH (meters) 4.330E-02			N-TEMP. (Kelvin) 8.92E-04	N-TEMP. (Kelvin) 8.92E-04
POT. AT 21 0.125512	ROUNDOFF RATIO (m/meters) 0.641			
POT. AT 22 0.125512				
POT. AT 71 0.125512				
POT. AT 72 0.125512				

## \* GENERAL CONSTANTS:

GRAVITATION	GRAVITATION	GRAVITATION	GRAVITATION	GRAVITATION	GRAVITATION
(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )	(m/sec <sup>2</sup> )
9.80665	9.80665	9.80665	9.80665	9.80665	9.80665

## \* GENERAL NOTES:

Accuracy limitation expected for measurement of Profile Slope and of Partial Derivative computation expected by interpolation of

SHI SLOPE = 0.125512  
POT. AT 21 = 0.125512

## \* RELEVANCE:

AIR DENSITY	AIR DENSITY	AIR DENSITY	AIR DENSITY
(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )	(kg/m <sup>3</sup> )
1.204	1.204	1.204	1.204

AIR DENSITY (kg/m<sup>3</sup>)  
1.204

WIND SPEED (m/sec)  
3.79E-02

RUN NUMBER: 7905092330  
 START TIME: 23:49:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 10 MIN  
 DATA AVERAGING PERIOD: 20 MIN

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius) 12.398	WIND SPEED (Meter/sec) 3.26	DEW POINT (Celsius) 9.84	TEMP. STRUC. (Kelvin/m/2/3) NO DATA	BAR. PRES. (millibar) 1013.35	BULK WT TEMP. (Celsius) 13.569	AIR-WT TEMP. (Kelvin) 11.171	POT-WT TEMP. (Kelvin) 11.873	WV-WT TEMP. (Kelvin) 11.109	V-POT-WT TEMP. (Kelvin) 10.299
HEIGHT (Meters) 10.00	POT. TEMP. (Celsius) 12.496	VIP TEMP. (Celsius) 13.698	V-POT TEMP. (Celsius) 13.776	ABS. HUMID. (Kg/m3) 9.211E-03	RFL. HUMID. (Percent) 84.35	SPEC. HUMID. (Kg/Kg) 7.445E-03	VAR. PRES. (millibar) 11.139	VAR. PRES. (millibar) 14.791	REF. INDEX (Kelvin/2/3) 10.0610

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978)

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.025 AT GMH	MOMENTUM FLUX (Nt/m2) -1.11E-02	FRICTION VELOCITY (Meters/sec) 9.477E-02	WITH LONG. VELOCITY (Meter/2/Sec2) -8.981E-03	AIR DENSITY (kg/m3) 1.2317
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.07E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.385E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.19E-05	AIR SPECIFIC HEAT (J/Kal/Kg) 2.416E-02
Z/L AT GMH -1.093	LAT. HEAT FLUX (Watts/m2) 2.71E-01	SCALING POT. TEMP. (Kelvin) -5.505E-02	WITH POT. TEMPERATURE (Meter Kel/Sec) 5.217E-03	WATER LAT. HEAT VAP. (J/Kal/Kg) 5.9130E-05
Z/L AT 10 METERS -0.841	SEN. HEAT FLUX (Watts/m2) 6.50E-06	ROUGHNESS LENGTH (Meters) 7.339E-08		VAP. PRES. AT WT LEVEL (millibar) 15.555
MONTIN-OBUKHOV LENGTH (Meters) -1.189E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.48E-01	DRAW COEF. AT 10 METERS (Dimensionless) 8.451E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.176E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.83E-01			BAX. PRES. AT WT LEVEL (millibar) 1014.55
	BOWEN RATIO (no. units) 0.240			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
156%	156%	73%	146%	146%	10%	105%	291%	37%	169%	169%	57%	73%
177%	177%	46%	44%	105%	10%	28%	148%	23%	67%	16%	43%	48%

\* CONTINUED BELOW

RUN NUMBER: 7905092330  
 START TIME: 23:49:10 PST  
 START DATE: 9 May 1979 (DAY 129)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CA

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 10 MIN  
 DATA AVERAGING PERIOD: 20 MIN

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.491 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.85E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.418E-01 (6.6E-01)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.24E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -8.329E-05 (3.0E-05)
Z/L AT GMH 0.526 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.08E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.871E-02 (2.0E-02)
Z/L AT 10 METERS 0.405 (0.02)	SEN. HEAT FLUX (Watts/m2) 4.52E-06 (3.0E+06)	ROUGHNESS LENGTH (Meters) 9.297E-06 (6.0E-05)
MONTIN-OBUKHOV LENGTH (Meters) -2.468E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.40E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 2.411E-03 (6.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.07E-01 (3.0E+01)	
	BOWEN RATIO (no. units) 0.173 (0.98)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED WITH THE STANDARD DATA FROM EITHER OR ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
102%	101%	39%	30%	53%	0%	15%	61%	44%	17%	84%	10%	65%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

EXPERIMENT: 0000000000  
NAVAL STATION: 0000000000  
DATE: 11 JUN 1980  
TIME: 0000Z (0000Z DAY 138)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## RAW DATA (CHANNEL NO. 0000000000)

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000)

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000) TRANSLATED INTO ENGINEERING UNITS

NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000) TRANSLATED INTO ENGINEERING UNITS

NO. 26	NO. 27	NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000) TRANSLATED INTO ENGINEERING UNITS

NO. 34	NO. 35	NO. 36	NO. 37	NO. 38	NO. 39	NO. 40	NO. 41
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000)

EXPERIMENT: 0000000000  
NAVAL STATION: 0000000000  
DATE: 11 JUN 1980  
TIME: 0000Z (0000Z DAY 138)

MARINE SURFACE LAYER  
NRL MICROMETEOROL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## RAW DATA (CHANNEL NO. 0000000000) TRANSLATED INTO ENGINEERING UNITS

NO. 42	NO. 43	NO. 44	NO. 45	NO. 46	NO. 47	NO. 48	NO. 49
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## RAW DATA (CHANNEL NO. 0000000000)

NO. 50	NO. 51	NO. 52	NO. 53	NO. 54
WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)	WIND SPEED (m/sec)	WIND DIR. (deg)
0.000	0.000	0.000	0.000	0.000

## MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2308

AIR SPECIFIC HEAT  
(J/kg K)  
2.4187

WATER LAT HEAT VAP  
(J/kg)  
5.9037

BUL NUMBER: 0700100000  
 STATION: 1017530000  
 DATE: 10 May 1979 (DAY 136)

MARKING SURFACE LAYER  
 NRL METEOROLOGICAL  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* COMPOSITE MEAN AND DERIVED PHYSICAL PARAMETERS AT TEN METERS:

WIND SPEED (m/sec)	WIND DIR (Degrees)	D.W. POINT (Celsius)	TEMP. STRESS (Kelvin/2/3)	BAR. PRESS. (Millibar)	BULK WT TEMP (Celsius)	AIR WT TEMP (Kelvin)	POT. WT TEMP (Kelvin)	VIR. WT TEMP (Kelvin)	V. POT. WT TEMP (Kelvin)
12.005	212	9.87	NO DATA	1013.37	13.564	-1.260	-1.167	6.044	6.147
REL. HUMID. (Percent)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRESS. (Millibar)	S. VAP. PRESS. (Millibar)	REF. INDEX (Kelvin/2/3)
10.10	12.402	13.600	13.706	9.250E-03	85.20	7.513E-03	12.186	14.303	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRITCH ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
STABILITY: -0.000000	MOMENTUM FLUX (N/m2) -4.24E-03	FRICITION VELOCITY (Meters/sec) 6.206E-02	WITH LONG. VELOCITY (Meter/Sec/2)	AIR DENSITY (Kg/m3) 1.2371
SCALING: -0.000000	MOISTURE FLUX (Kg/sec/m2) 7.35E-06	SCALING SPEC. HUMID. (Kg/Kg) -9.627E-05	WITH ABS. HUMIDITY (Meter Kg/sec/m3)	AIR SPECIFIC HEAT (J/Kg/Kelvin) 2.4160E-02
Z/L AT CAN -3.209	LAT. HEAT FLUX (Watts/m2) 1.02E-01	SCALING POT. TEMP. (Kelvin) -7.059E-02	WITH POT. TEMPERATURE (Meter Kel./sec)	WATER LAT. HEAT VAP (J/Kg/Kelvin) 5.9136E-05
Z/L AT 10 METERS 2.516	SEN. HEAT FLUX (Watts/m2) 5.46E-06	ROUGHNESS LENGTH (Meters) 1.346E-10		VAP. PRESS. AT WT LEVEL (Millibar) 15.551
MOIST. OBSCUR. LENGTH (Meters) 1.975E-11	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01	DRAW COEFF. AT 10 METERS (Dimensionless) 7.769E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.175E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.84E-01			VAP. PRESS. AT WT LEVEL (Millibar) 1014.57
	DOWN. RATIO (no units) 0.300			

\* A. ASSUMED ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. THE ROW ARE PRIORITIC ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "BEST GUESSES".

WIND DIR. REL. HUMID.	Z/L AT CAN	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICITION VELOCITY	SPEC. HUMIDITY	POT. TEMP.	ROUGH LENGTH	DRAW COEFF.
15%	15%	8%	15%	15%	10%	10%	30%	4%	11%	11%	6%	8%
15%	15%	4%	4%	10%	10%	14%	14%	2%	6%	12%	4%	4%

\* CONTINUED B. 10/4

BUL NUMBER: 0700100000  
 STATION: 1017530000  
 DATE: 10 May 1979 (DAY 136)

MARKING SURFACE LAYER  
 NRL METEOROLOGICAL  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* COMPOSITE MEAN AND DERIVED PHYSICAL PARAMETER VALUES AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESES.

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
STABILITY: -0.000000	MOMENTUM FLUX (N/m2) -1.32E-02 (1.61E-02)	FRICITION VELOCITY (Meters/sec) 9.429E-02 (1.61E-02)
SCALING: -0.000000	MOISTURE FLUX (Kg/sec/m2) 1.69E-06 (1.61E-06)	SCALING SPEC. HUMID. (Kg/Kg) -1.61E-05 (1.61E-05)
Z/L AT CAN -3.209	LAT. HEAT FLUX (Watts/m2) 2.15E-01 (1.61E-01)	SCALING POT. TEMP. (Kelvin) -3.69E-02 (1.61E-02)
Z/L AT 10 METERS 2.516	SEN. HEAT FLUX (Watts/m2) 3.78E-06 (1.61E-06)	ROUGHNESS LENGTH (Meters) 1.40E-06 (1.61E-06)
MOIST. OBSCUR. LENGTH (Meters) 1.975E-11	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01 (1.61E-01)	DRAW COEFF. AT 10 METERS (Dimensionless) 3.69E-04 (1.61E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.04E-01 (1.61E-01)	
	DOWN. RATIO (no units) 0.16 (1.61E-01)	

\* DERIVED BULK AERODYNAMIC AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION ERROR METHOD TO GIVE WEIGHTED COMPOSITE VALUES AND MEASUREMENT UNCERTAINTY VALUES WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESES. ALL VALUES ARE "BEST GUESSES".

WIND DIR. REL. HUMID.	Z/L AT CAN	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICITION VELOCITY	SPEC. HUMIDITY	POT. TEMP.	ROUGH LENGTH	DRAW COEFF.
10%	10%	8%	3%	5%	8%	14%	6%	4%	16%	16%	3%	10%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905100030  
START TIME: 0:45:40 PST  
END TIME: 1:13:50 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67.66  
DATA AVERAGING PERIOD: 10 min  
NOMENCLATURE: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DIR. POINT 1	DIR. POINT 2	WIND SPEED 1	WIND SPEED 2	DIR. PRES. 1	DIR. PRES. 2	SKY WIND
0.205	0.016	0.011	5.665	5.121	2.979	2.871	9.847	9.847	0.105
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
ROCK MT. TEMP.	AL. FREQUENCY	AL. VIB. TACH	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOL. TUBE 1	VOL. TUBE 2	WIND TUBE
3.076	5.839	2.056	0.031	0.001	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

No. 1	No. 2	UPWIND REAR	UPWIND TARD	UPWIND	UPWIND	UPWIND	UPWIND	UPWIND	UPWIND
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	HEIGHT	HEIGHT	HEIGHT	HEIGHT	HEIGHT	HEIGHT
1411.121828	1421.172888	3.296	65	3.308	3.308	3.308	3.308	3.308	3.308

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. 1	VOLT. REF. 2	VOLT. REF. 3	VOLT. REF. 4	VOLT. REF. 5	VOLT. REF. 6	VOLT. REF. 7
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	160	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE COR. AND ESCAPEMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DIR. POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	DIR. PRES. 1	SKY WIND	ROCK MT. TEMP.	AL. FREQUENCY	AL. VIB. TACH
(Celsius)	(meter/sec)	(Celsius)	(Celsius)	(Degree)	(millibar)	(meter/sec)	(Celsius)	(Hz)	(Hz)
12.184	3.75	9.94	NO DATA	335.6	1017.33	1.47E-01	13.502	5.839	2.056
AIR TEMP. 2	WIND SPEED 2	DIR. POINT 2	TEMP. STRUCT. 2	TIDE TACHE	DIR. PRES. 2				
(Celsius)	(meter/sec)	(Celsius)	(Celsius)	(meter/sec)	(millibar)				
12.287	5.39	9.98	NO DATA	10.61	1013.13				

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	SWAT. PRES. 1	SEA. LEVEL
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(millibar)	(millibar)	(meters)
13.35	12.364	13.491	13.671	9.268E-03	85.13	7.535E-03	12.265	14.171	0.000
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	SWAT. PRES. 2	SEA. LEVEL
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(kg/kg)	(millibar)	(millibar)	(meters)
9.98	12.377	13.594	13.684	9.268E-03	85.13	7.535E-03	12.169	14.165	0.000

## \* CONTINUED BELOW

RUN NUMBER: 7905100030  
START TIME: 0:45:40 PST  
START DATE: 10 May 1979 (DAY 131)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 67.66  
DATA AVERAGING PERIOD: 10 min  
NOMENCLATURE: 1 UPPER LEVEL, 2 LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILES WITH HEIGHT
CHADWICK RICHARDSON NUMBER (calculable, 0.039) AT 0.039	MOLENTUM FLUX (kg/m2) -0.92E-02	EMPIRICAL VELOCITY (meters/sec) 2.572E-01	GENERAL FLUX EQUATION (kg/m2) (21x22) (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 1.00E-01 (21x22) (21x22)
CHADWICK RICHARDSON NUMBER (calculable, 0.039) AT 0.039	MOLENTUM FLUX (kg/m2) -0.92E-02	EMPIRICAL VELOCITY (meters/sec) 2.572E-01	GENERAL FLUX EQUATION (kg/m2) (21x22) (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 1.00E-01 (21x22) (21x22)
CHADWICK RICHARDSON NUMBER (calculable, 0.039) AT 0.039	MOLENTUM FLUX (kg/m2) -0.92E-02	EMPIRICAL VELOCITY (meters/sec) 2.572E-01	GENERAL FLUX EQUATION (kg/m2) (21x22) (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 1.00E-01 (21x22) (21x22)
Z/L AT 0.039	LAT. HEAT FLUX (Watts/m2) 4.91E-01	SCALING POT. TEMP. (Celsius) -1.306E-02	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)
Z/L AT 10 METERS	SEN. HEAT FLUX (Watts/m2) 3.86E-01	SCALING POT. TEMP. (Celsius) -1.306E-02	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)
Z/L AT Z1	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01	SCALING POT. TEMP. (Celsius) -1.306E-02	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)
Z/L AT Z2	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.76E-01	SCALING POT. TEMP. (Celsius) -1.306E-02	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)
DOWNWIND DRIFT LENGTH (meters) 2.00E-02	TOTAL HEAT BUDGET FLUX (Watts/m2) 6.76E-01	SCALING POT. TEMP. (Celsius) -1.306E-02	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)	MOLENTUM FLUX (kg/m2) 2.00E-01 (21x22) (21x22)
POT. AT Z1: 0.107374 POT. AT Z2: 0.105152 POT. AT Z1: 0.119648 POT. AT Z2: 0.106126	POT. AT Z1: 0.107374 POT. AT Z2: 0.105152 POT. AT Z1: 0.119648 POT. AT Z2: 0.106126	POT. AT Z1: 0.107374 POT. AT Z2: 0.105152 POT. AT Z1: 0.119648 POT. AT Z2: 0.106126	POT. AT Z1: 0.107374 POT. AT Z2: 0.105152 POT. AT Z1: 0.119648 POT. AT Z2: 0.106126	POT. AT Z1: 0.107374 POT. AT Z2: 0.105152 POT. AT Z1: 0.119648 POT. AT Z2: 0.106126

## \* GENERAL CONSTANTS:

VON KARMAN	GRAVITATION	PROF. 1	PROF. 2	ROCK	ROCK	MISCELLANEOUS
CONSTANT	ACCELERATION	PROF. 1	PROF. 2	ROCK	ROCK	AIR DENSITY
0.4	9.79E-02	0.74	0.74	0.92E-03	1.30E-03	1.2305

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative  
Computation exceeded by insertion of:

DIR. SHIP: 42 DIR. 3 KPH

## \* MISCELLANEOUS

AIR DENSITY
1.2305

AIR SPECIFIC HEAT
2.41E-02

WATER LAT. HEAT CAP.
5.9979E-03



PRINT DATE: 11 JUL 1990  
DATA SOURCE: RAIL - RAILROADS  
DATA ADDRESS: RAILROADS

TEST	UNIT	TEST	UNIT	TEST	UNIT	TEST	UNIT	TEST	UNIT
WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP
(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)
1.00	9.90	1.00	9.90	1.00	9.90	1.00	9.90	1.00	9.90
WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP	WATER VOLUME	WATER PUMP
(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)	(GALLONS)
1.00	9.90	1.00	9.90	1.00	9.90	1.00	9.90	1.00	9.90

[illegible]

GRAD. RICH. NO. AT CMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SKY SPEC. HUMIDITY	SL. FRI. TIME	WINDS INDEX	WIND DIR.
139Z	139Z	164Z	160Z	112Z	10Z	117Z	223Z	52Z	169Z	61Z	5Z	164Z
174Z	174Z	46Z	44Z	132Z	10Z	59Z	146Z	27Z	62Z	111Z	4Z	30Z

PRINT Date: 11 Feb 1978  
 PRINT OFFICE: Scott Air Force Base, IL  
 DATA ACQUISITION PROJECT: 1000

STABILITY	FLUX PARAMETERS (+Z, -Z, BZ)	SCALING PARAMETERS
GRAD RICHARDSON NUMBER (+Stable, Unstable) 0.131 (6.0E-1 AT 6M)	MOMENTUM FLUX (N/m <sup>2</sup> ) -4.61E-02 (6.0E-02)	HEAT FLUX (W/M <sup>2</sup> ) 1.94E-01 (2.0E-01)
COINTEGRATED WIND HEIGHT (Meter) GM-Z1-Z2-Z3-ZP 12.99	DIFFUSIVITY FLUX (M <sup>2</sup> /SEC/M <sup>2</sup> ) 1.04E-05 (1E-05)	COINTEGRATED HEAT FLUX (W/M <sup>2</sup> ) 5.75E-05 (1E-05)
Z/L AT GMH 0.148 (0.02)	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.48E-01 (2.0E+01)	SCALING FACTOR (+Stable, -Unstable) 1.53E-02 (2.0E+02)
Z/L AT 10 METERS 0.114 (0.02)	SURF. HEAT FLUX (Watts/m <sup>2</sup> ) 2.84E-02 (3.0E+02)	ROUGHNESS LENGTH (Meters) 1.6E-05 (1E-05)
MONIN OBUKHOV LENGTH (Meters) -8.264E-01	SEA AND SWELL HEAT FLUX (Watts/m <sup>2</sup> ) 1.42E-01 (2.0E+01)	WIND SPEED AT 10 METERS (Meters/sec) 1.34E-01 (2.0E-01)
	TOTAL HEAT FLUXET FLUX (Watts/m <sup>2</sup> ) 6.73E-01 (2.0E+01)	
	WIND RATIO (No units) 0.121 (1.0E0)	

[illegible]

# MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
GODDARD SPACE FLIGHT RESEARCH STATION  
GREENBELT, MARYLAND, CALIFORNIA

\*\*\*\*\* MICROMETEOROLOGICAL DATA \*\*\*\*\*

EXPERIMENT NUMBER: 0001  
DATE: 11 JUN 1980  
TIME: 1400Z (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.25 Hz  
DATA AVERAGING PERIOD: 20 Min  
ORIENTATION: 1=UPPER LEVEL, 2=LOWER LEVEL

## 1.0 OBSERVED DATA (RAW DATA) (NO CORRECTIONS)

NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
WIND SPEED 1 (m/sec)	WIND SPEED 2 (m/sec)	DIR. WIND 1 (deg)	DIR. WIND 2 (deg)	WIND SPEED 1 (m/sec)	WIND SPEED 2 (m/sec)	DIR. WIND 1 (deg)	DIR. WIND 2 (deg)	WIND DIR (deg)
1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
WIND SPEED 1 (m/sec)	WIND SPEED 2 (m/sec)	DIR. WIND 1 (deg)	DIR. WIND 2 (deg)	WIND SPEED 1 (m/sec)	WIND SPEED 2 (m/sec)	DIR. WIND 1 (deg)	DIR. WIND 2 (deg)	WIND DIR (deg)
1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000

## 2.0 ESCAPEMENT DATA (NO CORRECTIONS)

ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS

NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18
UPWARD WIND (m/sec)	DOWNWARD WIND (m/sec)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 3.0 ESCAPEMENT DATA (NO CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24	NO. 25	NO. 26	NO. 27
UPWARD WIND (m/sec)	DOWNWARD WIND (m/sec)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 4.0 ESCAPEMENT DATA (NO CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

NO. 28	NO. 29	NO. 30	NO. 31	NO. 32	NO. 33	NO. 34	NO. 35	NO. 36
UPWARD WIND (m/sec)	DOWNWARD WIND (m/sec)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 5.0 ESCAPEMENT DATA (NO CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

NO. 37	NO. 38	NO. 39	NO. 40	NO. 41	NO. 42	NO. 43	NO. 44	NO. 45
UPWARD WIND (m/sec)	DOWNWARD WIND (m/sec)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 6.0 ESCAPEMENT DATA

EXPERIMENT NUMBER: 0001  
DATE: 11 JUN 1980  
TIME: 1400Z (DAY 130)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.25 Hz  
DATA AVERAGING PERIOD: 20 Min  
ORIENTATION: 1=UPPER LEVEL, 2=LOWER LEVEL

## 7.0 ESCAPEMENT DATA (NO CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS

NO. 46	NO. 47	NO. 48	NO. 49	NO. 50	NO. 51	NO. 52	NO. 53	NO. 54
UPWARD WIND (m/sec)	DOWNWARD WIND (m/sec)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)	WIND DIR (deg)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## 8.0 ESCAPEMENT DATA

EXPERIMENT NUMBER: 0001  
DATE: 11 JUN 1980  
TIME: 1400Z (DAY 130)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.25 Hz  
DATA AVERAGING PERIOD: 20 Min  
ORIENTATION: 1=UPPER LEVEL, 2=LOWER LEVEL

## 9.0 ESCAPEMENT DATA

EXPERIMENT NUMBER: 0001  
DATE: 11 JUN 1980  
TIME: 1400Z (DAY 130)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.25 Hz  
DATA AVERAGING PERIOD: 20 Min  
ORIENTATION: 1=UPPER LEVEL, 2=LOWER LEVEL

RUN NUMBER: 00000101  
 START TIME: 11:41:00 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP (Celsius) 12.243	WIND SPEED (Meters/sec) 3.44	DW POINT (Celsius) 9.94	TEMP. STRUC. (Kelvin/m <sup>2/3</sup> ) NO DATA	BAR. PRES. (millibar) 1013.17	BULK WT TEMP (Celsius) 13.508	AIR WT TEMP (Kelvin) -1.273	POT-WT TEMP (Kelvin) -1.175	VIR-WT TEMP (Kelvin) 0.035	V.POT-WT TEMP (Kelvin) 0.133
REL. HUMID. (Celsius) 10.04	POT. TEMP. (Celsius) 12.333	VIR. TEMP. (Celsius) 13.543	V. POT. TEMP. (Celsius) 13.641	AHS. HUMID. (Kg/m <sup>3</sup> ) 9.280E-03	REL. HUMID. (Percent) 65.86	SPEC. HUMID. (Kg/Kg) 7.537E-03	VAP. PRES. (Millibar) 12.222	S. VAP. PRES. (Millibar) 14.235	REF. INDEX (Kelvin-2/3) NO DATA

\* LINK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
STABILITY NUMBER (Stability Number) 1.933 AT 10M	MOMENTUM FLUX (N/m <sup>2</sup> ) 1.25E-02	FRICTION VELOCITY (Meters/sec) 1.068E-01	WITH LONG. VELOCITY (Meter <sup>2</sup> /sec <sup>2</sup> ) -1.016E-02	AIR DENSITY (Kg/m <sup>3</sup> ) 1.2311
SCALING HEAT FLUX (Meter <sup>2</sup> /sec <sup>2</sup> ) 1.10E-05	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.10E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.896E-05	WITH AHS. HUMIDITY (Meter Kg/sec m <sup>3</sup> ) 1.104E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4163E 02
REL. AT 10M 10.592	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.73E 01	SCALING POT. TEMP. (Kelvin) -5.677E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.721E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
REL. AT 10 METERS 10.762	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 2.13E 01	ROUGHNESS LENGTH (Meters) 1.415E-07		VAP. PRES. AT 10 LEVEL (Millibar) 15.491
ROUGHNESS LENGTH (Meters) 1.415E-07	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.47E 01	DRAG COEF. AT 10 METERS (Dimensionless) 8.572E-04		ABS. HUMID. AT 10 LEVEL (Kg/m <sup>3</sup> ) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 4.91E 01			BAR. PRES. AT 10 LEVEL (Millibar) 1014.37
	DOWN RATIO (No. units) 0.261			

\* A SUMMARY ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES  
 THE ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE LINK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
263%	263%	20%	267%	234%	10%	142%	47%	110%	127%	124%	130%	221%
17%	17%	46%	44%	101%	10%	29%	145%	23%	67%	124%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 00000101  
 START TIME: 11:41:00 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* ESTIMATED PROFILE AND LINK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS  
 WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
STABILITY NUMBER (Stability Number) 1.933 AT 10M AT 10M	MOMENTUM FLUX (N/m <sup>2</sup> ) 1.25E-02 (1.60E-02)	FRICTION VELOCITY (Meters/sec) 1.068E-01 (1.60E-01)
SCALING HEAT FLUX (Meter <sup>2</sup> /sec <sup>2</sup> ) 1.10E-05	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.10E-05 (1.60E-05)	SCALING SPEC. HUMID. (Kg/Kg) -8.896E-05 (1.60E-05)
REL. AT 10M 10.592	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.73E 01 (1.60E+01)	SCALING POT. TEMP. (Kelvin) -5.677E-02 (1.60E-02)
REL. AT 10 METERS 10.762	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 2.13E 01 (1.60E+01)	ROUGHNESS LENGTH (Meters) 1.415E-07 (1.60E-07)
ROUGHNESS LENGTH (Meters) 1.415E-07	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.47E 01 (1.60E+01)	DRAG COEF. AT 10 METERS (Meters) 8.572E-04 (1.60E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 4.91E 01 (1.60E+01)	
	DOWN RATIO (No. units) 0.261 (1.60E)	

\* THE FOLLOWING TABLE OF PROFILE AND LINK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE  
 MEASUREMENT OR PROFILE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE  
 LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. AT 10M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	DOWN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
263%	263%	1%	9%	6%	0%	13%	59%	24%	6%	75%	0%	30%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NASA RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE MICROPHYSICS RESEARCH DIVISION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* AIRCRAFT MICROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905100130  
START TIME: 11:42:10 PST  
END TIME: 11:50:00 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (ANALOG CHANNELS)

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
VOL. REF. 1	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW. POINT 1	DEW. POINT 2	WIND. SPEED 1	WIND. SPEED 2	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3
6.205	0.000	0.001	5.094	5.047	2.155	2.060	4.000	3.000	2.000
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19
BULK WT. TEMP.	AIR FREQUENCY	AIR FREQUENCY	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3	WIND. DIR. 4	WIND. DIR. 5	WIND. DIR. 6	WIND. DIR. 7
3.014	5.094	5.047	0.001	0.001	0.001	0.001	0.001	0.001	0.001

## \* DIGITAL CHANNEL RAW DATA (ANALOG CHANNELS) ESCAPEMENT DATA (ALL CHANNELS) AND WIND SPEED ESCAPEMENT CORRECTIONS

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10
AIR TEMP. 1	AIR TEMP. 2	DEW. POINT 1	DEW. POINT 2	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3	WIND. DIR. 4	WIND. DIR. 5	WIND. DIR. 6
12.115	12.115	12.115	12.115	12.115	12.115	12.115	12.115	12.115	12.115

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS

MANUAL FLAG	ERROR COUNT	DATA BASE	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3	WIND. DIR. 4	WIND. DIR. 5	WIND. DIR. 6	WIND. DIR. 7
0	0	0	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ANALOG CHANNELS) AND ESCAPEMENT CORRECTIONS TRANSLATED INTO ENGINEERING UNITS

AIR TEMP. 1	WIND. SPEED 1	DEW. POINT 1	DEW. POINT 2	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3	WIND. DIR. 4	WIND. DIR. 5	WIND. DIR. 6
12.115	4.14	12.115	12.115	12.115	12.115	12.115	12.115	12.115	12.115

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS

HEIGHT, Z1	POT. TEMP. 1	WIND. SPEED 1	WIND. DIR. 1	WIND. DIR. 2	WIND. DIR. 3	WIND. DIR. 4	WIND. DIR. 5	WIND. DIR. 6	WIND. DIR. 7
18.35	12.335	13.478	13.657	9.376E-03	87.27	7.622E-03	12.346	14.148	NO DATA

\* CONTINUED BELOW

RUN NUMBER: 7905100130  
START TIME: 11:42:10 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NRI MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSENBERG, 1973):

STABILITY	FLUX PARAMETERS	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES
GRAD. RICHARDSON NUMBER (-Stable, -Unstable) -0.074 AT 0M	MOMENTUM FLUX (N/m <sup>2</sup> ) -3.45E-02	FRICITION COEFF. (meters/sec) 1.659E-01	GENERAL FORM: DN/DZ FRICTION COEFF. (Z1/Z2) <sup>1/4</sup> (Z1/Z2) <sup>1/2</sup>	GENERAL FORM: DN/DZ FRICTION COEFF. (Z1/Z2) <sup>1/4</sup> FRICTION COEFF. (Z1/Z2) <sup>1/2</sup>
GEOMETRIC MEAN HEIGHT (Meters) GMH = (Z1+Z2)/2 12.99	HUMIDITY FLUX (kg/sec/m <sup>2</sup> ) 1.47E-05	SCALING POT. TEMP. (K/m) 7.171E-05	WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
Z/L AT GMH -0.088	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 3.64E-01	SCALING POT. TEMP. (K/m) 1.174E-02	WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
Z/L AT 10 METERS -0.067	SUN. HEAT FLUX (Watts/m <sup>2</sup> ) 2.44E-00	ROUGHNESS LENGTH (Meters) 6.311E-06	WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
Z/L AT Z1 -0.104	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.47E-01	DRAG COEFF. AT 10 METERS (dimensionless) 1.619E-05	WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
Z/L AT Z2 -0.062	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 5.35E-01		WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
MONIN DRIFTING LENGTH (Meters) -1.485E-02	BOWEN RATIO (no units) 0.067		WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01
PSI1 AT Z1 = 0.316229 PSI1 AT Z2 = 0.165001 PSI2 AT Z1 = 0.204316 PSI2 AT Z2 = 0.116922			WIND SPEED (M/sec) Z-HEIGHT (Meters) WIND SPEED (M/sec) WIND DIR. (Meters)	WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI-PSI1 WIND SLOPE = 2.40E-01

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units) 0.4	GRAVITATION (m/sec <sup>2</sup> ) 9.7959	PRANDTL NUMBER 0.74	PROF. SCHMIDT NUMBER 0.74	BULK HEAT TRANSFER COEFF. 0.92E-03	BULK HEAT TRANSFER COEFF. 1.33E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(kg/m<sup>3</sup>)  
1.2369

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivatives.  
Computation executed by insertion of:

SHI SHI = 2.40E-03 Kq/Kq.

AIR SPECIFIC HEAT  
(J/kg-Kelvin)  
2.4164E-02

WATER LAT. HEAT VAP.  
(J/kg-Kelvin)  
5.9341E-05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905100130  
 START TIME: 1:42:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 28 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-M-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V. POT-WT TEMP (Kelvin)
12.246	3.94	10.07	NO DATA	1013.16	13.461	-1.215	-1.117	0.104	0.262

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-M-2/3)
10.00	12.344	13.565	13.663	9.350E-03	86.52	7.601E-03	12.325	14.245	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) -0.617 AT GMH	MOMENTUM FLUX (Nt/m2) -1.70E-02	FRICTION VELOCITY (Meters/sec) 1.175E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.381E-02	AIR DENSITY (kg/m3) 1.2310
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 1.21E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.330E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.205E-05	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -0.665	LAT. HEAT FLUX (Watts/m2) 2.98E 01	SCALING POT. TEMP. (Kelvin) -5.148E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 6.049E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9039E 05
Z/L AT 10 METERS -0.512	SEN. HEAT FLUX (Watts/m2) 7.53E 00	ROUGHNESS LENGTH (Meters) 5.878E-07		VAP. PRES. AT WT LEVEL (Millibar) 15.443
MONIN-OBUKHOV LENGTH (Meters) -1.954E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E 01	DRAW COEF. AT 10 METERS (Dimensionless) 8.900E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.168E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.20E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.36
	BOWEN RATIO (no units) 0.253			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
158%	158%	119%	171%	132%	10%	116%	303%	60%	111%	72%	80%	119%
175%	175%	46%	45%	103%	10%	30%	148%	23%	68%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905100130  
 START TIME: 1:42:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 28 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN ( ):

STABILITY	FLUX PARAMETERS (+=UP, -=DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+=Stable, -=Unstable) 0.331 (0.02) AT GMH	MOMENTUM FLUX (Nt/m2) -2.18E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 1.313E-01 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)^(1/2) 12.99	HUMIDITY FLUX (Kg/sec m2) 1.26E-05 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.890E-05 (3.0E-05)
Z/L AT GMH -0.361 (0.02)	LAT. HEAT FLUX (Watts/m2) 3.12E 01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.626E-02 (2.0E-02)
Z/L AT 10 METERS -0.278 (0.02)	SEN. HEAT FLUX (Watts/m2) 5.30E 00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.594E-06 (6.0E-06)
MONIN-OBUKHOV LENGTH (Meters) -3.595E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E 01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.322E 03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.24E 01 (3.0E+01)	
	BOWEN RATIO (no units) 0.192 (0.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
82%	80%	16%	12%	48%	0%	2%	51%	21%	8%	78%	51%	73%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\*\*\* MICROMETEOROLOGICAL DATA \*\*\*

RUN NUMBER: 790510000  
START TIME: 21:00:10 PST  
END TIME: 21:39:00 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (COVERED VDO):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
CELLS/FW	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DW. POINT 1	DW. POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 2	SKY RAD.	WIND DIR.
0.205	0.000	0.001	5.097	5.153	2.063	1.974	4.620	-0.106	6.456
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT. TEMP.	AC FREQ. FLOW	AC VOLT. FLUX	PARALL. FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.076	0.000	0.000	0.001	0.001	0.001	0.001	0.295		

## \* DIGITAL CHANNEL RAW DATA (COVERED):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS

No. 18	No. 19	WIND SPEED		WIND DIRECTION	WIND SPEED	WIND DIRECTION	WIND SPEED	WIND DIRECTION	WIND SPEED	WIND DIRECTION
WIND SPEED 1	WIND SPEED 2	WIND DIRECTION 1	WIND DIRECTION 2	WIND SPEED 1	WIND SPEED 2	WIND DIRECTION 1	WIND DIRECTION 2	WIND SPEED 1	WIND SPEED 2	WIND DIRECTION 1
1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

PARALL. FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DIV.	VOLT. REF. DIV.	ZERO REF. DIV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
0	0	100	1	0	0	0	0	110.5	59.60

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DW. POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
12.145	1.99	10.13	NO DATA	4.5	1012.16	1.47E 01	13.444	265.358
AIR TEMP. 2	WIND SPEED 2	DW. POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
12.250	1.76	10.09	NO DATA	NO DATA	1013.26			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ARS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
10.35	12.375	13.489	13.649	9.390E-03	87.46	7.633E-03	12.364	14.137	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ARS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
9.23	12.343	13.071	13.661	9.374E-03	86.65	7.614E-03	12.348	14.250	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 790510000  
START TIME: 21:00:10 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 Min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PKG FILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSTINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.099	MOISTURE FLUX (M/sec) -3.12E-02	FRICTION VELOCITY (Meters/sec) 1.604E-01	GENERAL FORM: $DN/DZ = (N1-N2)/(1+(Z1-Z2)^2)^{1/2}$	GENERAL FORM: $N'SLOPE = [(LnZ1-PSI)-(LnZ2-PSI)]/(N1-N2)$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kq/sec m2) 1.46E-05	SCALING SPEC. HUMID. (Kq/Kg) 7.379E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) $DSH/DZ = 2.49E-02$	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis $PSI=PSI2$ WS SLOPE = 2.49E 00
Z/L AT GMH 0.115	LAT. HEAT FLUX (Watt/m2) 3.60E 01	SCALING POT. TEMP. (Kelvin) 1.376E-02	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N=SPEC. HUMIDITY (Kq/Kg) Z=HEIGHT (M) Vert. Axis $PSI=PSI2$ SH SLOPE = -7.37E 03
Z/L AT 10 METER -0.309	SEA HEAT FLUX (Watt/m2) 7.75E 00	ROUGHNESS LENGTH (Meters) 5.064E-06	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) $DPT/DZ = -1.67E-03$	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis $PSI=PSI2$ PTK SLOPE = -3.93E 01
Z/L AT Z1 -0.163	SKY AND SOLAR HEAT FLUX (Watt/m2) 1.47E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 2.677E-03		N=LTEMP. STRUCT. (KxM-2/3) Z=HEIGHT (M) Vert. Axis $PSI=NONE$ CT2 SLOPE=NO DATA
Z/L AT Z2 0.082	TOTAL HEAT FLUX (Watt/m2) 5.34E 01			
ROUGHNESS LENGTH (Meters) -1.127E 02				
PSI1 AT Z1 = 0.38453 PSI1 AT Z2 = 0.53976 PSI2 AT Z1 = 0.25677 PSI2 AT Z2 = 0.14216	MOIST. RATIO (no units) 0.076			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (no units) 0.4	GRAVITATION (M/sec2) 9.7999	PROFILE TOK. SCHMIDT NUMBER 6.74	PROFILE TOK. SCHMIDT NUMBER 6.74	BULK SEA HEAT TRANSF. COEFF. 0.92E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
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## \* MISCELLANEOUS

AIR DENSITY  
(Kq/m3)  
1.2308

## \* GENERAL NOTES:

Accuracy limitation extended for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SHI SHP = 1.00E-03 Kq/Kg

AIR SPECIFIC HEAT  
(J/Kq Kel.)  
2.4165E 02

WATER LAT. HEAT VAP.  
(J/Kq)  
5.9042E 05

\* CONTINUED ON NEXT PAGE

RUN NUMBER: 7905100200  
 START TIME: 2:10:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 28 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.237	5.79	10.10	NO DATA	1015.17	13.444	-1.206	-1.108	6.115	6.213

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S.VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.00	12.335	13.559	13.657	7.372E-03	86.75	7.617E-03	12.350	14.237	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIED ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) 0.084 AT 6M	MOMENTUM FLUX (Nt/m2) -1.56E-02	FRICTION VELOCITY (Meters/sec) 1.125E-01	WITH LONG. VELOCITY (Meter2/sec2) -1.265E-02	AIR DENSITY (Kg/m3) 1.2311
GEOMETRIC MEAN HEIGHT (meter) GMH=(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 1.14E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.76E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 1.144E-05	AIR SPECIFIC HEAT (J/Kcal/Kg) 2.416E-02
Z/L AT 6M -0.736	LAT. HEAT FLUX (Watts/m2) 2.83E-01	SCALING POT. TEMP. (Kelvin) -5.216E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.866E-03	WATER LAT. HEAT VAP. (J/Kcal/Kg) 5.9039E-03
Z/L AT 10 METERS 0.566	SEN. HEAT FLUX (Watts/m2) 7.31E-00	ROUGHNESS LENGTH (Meters) 4.028E-07		VAP. PRES. AT WT LEVEL (Millibar) 15.426
MONIN-OBUKHOV LENGTH (Meters) -1.767E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01	DRAW COEF. AT 10 METERS (Dimensionless) 8.802E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.166E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.03E-01			HAR PRES. AT WT LEVEL (Millibar) 1014.37
	BOWEN RATIO (no units) 0.258			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
154%	154%	125%	175%	128%	10%	118%	303%	63%	112%	66%	83%	125%
175%	175%	46%	45%	103%	10%	30%	149%	23%	68%	126%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905100200  
 START TIME: 2:13:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 28 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+ Stable, - Unstable) -0.373 (10.02) AT 6M	MOMENTUM FLUX (Nt/m2) -1.99E-02 (1.0E-02)	FRICTION VELOCITY (Meters/sec) 1.254E-01 (1.6E-02)
GEOMETRIC MEAN HEIGHT (meter) GMH=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kg/sec m2) 1.21E-05 (1.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.924E-05 (3.0E-05)
Z/L AT 6M 0.136 (10.02)	LAT. HEAT FLUX (Watts/m2) 2.99E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -2.691E-02 (2.0E-02)
Z/L AT 10 METERS 0.312 (10.02)	SEN. HEAT FLUX (Watts/m2) 5.28E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 2.04E-06 (1.6E-05)
MONIN-OBUKHOV LENGTH (Meters) -3.262E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 1.31E-03 (1.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.05E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.198 (10.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICHEVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOM. FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCI. SPEC. HUMIDITY	SCI. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
77%	77%	15%	15%	43%	0%	4%	40%	21%	61%	75%	41%	77%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* MICROMETEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905100230  
START TIME: 2:38:10 PST  
END TIME: 3:4:10 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 28 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.000	0.001	5.144	5.191	1.712	1.646	4.027	-0.106	6.644
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17		
BULK WT TEMP	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ZERO REF.	SPARE A	SPARE B	VOLT. REF. B		
3.608	3.918	2.546	0.001	9.001	0.001	0.001	6.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS.

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	DP1FCAL	DP2FCAL	W1FCAL	W2FC	W2FC
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Coeff.)	(Coeff.)
1411 121779	1421 122793	0.168	60	-0.008	-0.053	0.000	0.993	0.996

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSLATED INTO ENGINEERING UNITS:

MANUAL FLAG	ERROR COUNT	DATA DATE	VOLT. REF. DEV	VOLT. REF. DEV	ZERO REF. DEV	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 0.005V)	B (No. 0.005V)	(No. 0.002V)	(No. 0.5V)	(No. 0.1Hz)	(VAC)	(Hz)
0	0	168	0	0	0	0	0	115.5	59.92

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR.	BAR. PRES. 1	SKY RAD.	BULK WT TEMP	AIR TEMP
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Deg. True)	(Millibar)	(Watt/m2)	(Kelvin)	(Kelvin-2/3)
12.178	3.33	10.40	NO DATA	10.9	1012.27	1.47E 01	13.455	265.369
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(Kelvin-2/3)	(Meter MSL)	(Millibar)			
12.279	3.20	10.32	NO DATA	-0.76	1013.37			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	AIR HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	12.358	13.527	13.707	9.564E-03	88.89	7.775E-03	12.594	14.169	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	AIR HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m3)	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	12.370	13.621	13.712	9.520E-03	87.83	7.733E-03	12.541	14.279	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905100230  
START TIME: 2:38:10 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 28 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+IN, -WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.215 AT GH	MOMENTUM FLUX (Nt/m2) -1.49E-02	FRICTION VELOCITY (Meters/sec) 1.099E-01	GENERAL FORM: $DN/DZ = [(N1-N2)/(Ln(Z1/Z2))] * (Z1*Z2)^{1/2}$	GENERAL FORM: $N SLOPE = [(LnZ1-PSI1)-(LnZ2-PSI2)] / [N1-N2]$
GEOMETRIC MEAN HEIGHT (Meter) $GMH = (Z1+Z2)/2$ 12.99	HUMIDITY FLUX (Kg/sec m2) 1.00E-05	SCALING SPEC. HUMID. (Kg/Kg) -8.019E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DWS/DZ = 1.44E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 3.64E 00
Z/L AT GH -0.241	LAT. HEAT FLUX (Watts/m2) 2.69E 01	SCALING POT. TEMP. (Kelvin) -1.179E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (Meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -6.74E 03
Z/L AT 10 METERS -0.185	SEN. HEAT FLUX (Watts/m2) 1.61E 00	ROUGHNESS LENGTH (Meters) 3.271E-07	N-POT. TEMP. (Kelvin) Z-HEIGHT (Meters) DPT/DZ = -1.31E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -4.59E 01
Z/L AT Z1 -0.540	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E 01	DRAW COEF. AT 10 METERS (Dimensionless) 2.011E-03		N=LnTEMP. STRUCT. (KELVIN-2/3) Z-HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.170	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.32E 01			
MONIN-OBUKHOV LENGTH (Meters) -5.398E 01	BOWEN RATIO (no units) 0.060			
PSI1 AT Z1 = 0.616188 PSI1 AT Z2 = 0.396900 PSI2 AT Z1 = 0.410375 PSI2 AT Z2 = 0.259203				

## \* GENERAL CONSTANTS:

VON KARMAN	GRAVITATION	PROFILE	PROFILE	BULK	BULK
CONSTANT	ACCELERATION	TUR. PRANDTL	TUR. SCHMIDT	SEN. HEAT	MOISTURE
(No units)	(M/sec 2)	NUMBER	NUMBER	TRANSF. COEF.	TRANSF. COEF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1-SH2 = +/- .08; -3 Kg/Kg.

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2307

AIR SPECIFIC HEAT  
(Jcal./Kg Kel.)  
2.4167E 02

WATER LAT. HEAT VAP.  
(Jcal./Kg)  
5.9040E 05



RUN NUMBER: 7905100230  
 START TIME: 2:38:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 28 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.267	3.22	16.33	NO DATA	1013.27	13.455	-1.188	-1.090	0.155	0.253

HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	AKS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPFC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-2/3)
10.30	12.365	13.610	13.708	9.326E-03	87.95	7.730E-03	12.548	14.266	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 1.075 AT 6M	MOMENTUM FLUX (Nt/m2) -1.07E-02	FRICTION VELOCITY (Meters/sec) 9.334E-02	WITH LONG. VELOCITY (Meter2/sec2) -8.712E-03	AIR DENSITY (Kg/m3) 1.2316
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.11E-06	SCALING SPEC. HUMID. (Kg/Kg) -7.931E-05	WITH AKS. HUMIDITY (Meter Kg/sec m3) 9.112E-06	AIR SPECIFIC HEAT (Jcal./Kg Kel.) 2.416E-02
Z/L AT 6M -1.146	LAT. HEAT FLUX (Watts/m2) 2.25E-01	SCALING POT. TEMP. (Kelvin) -5.598E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 5.225E-03	WATER LAT. HEAT VAP. (Jcal./Kg) 5.9038E-05
Z/L AT 10 METERS -0.882	SEN. HEAT FLUX (Watts/m2) 6.51E-00	ROUGHNESS LENGTH (Meters) 6.185E-08		VAP. PRES. AT WT LEVEL (Millibar) 5.439
MONIN-OBUKHOV LENGTH (Meters) -1.134E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01	DRAW COEF. AT 10 METERS (Dimensionless) 8.423E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.167E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.38E-01			BAR. PRES. AT WT LEVEL (Millibar) 1014.47
	BOWEN RATIO (no units) 0.289			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "BEST" ESTIMATES.

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
209%	209%	187%	217%	185%	10%	135%	402%	94%	123%	91%	114%	187%
176%	176%	46%	47%	104%	10%	29%	151%	23%	70%	127%	4%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905100230  
 START TIME: 2:38:10 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/Min  
 DATA AVERAGING PERIOD: 28 Min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESES:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.68 (10.02) AT 6M	MOMENTUM FLUX (Nt/m2) -1.15E-02 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 9.660E-02 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1+Z2)1/2 12.99	HUMIDITY FLUX (Kg/sec m2) 9.42E-06 (8.0E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.963E-05 (3.0E-05)
Z/L AT 6M 0.733 (10.02)	LAT. HEAT FLUX (Watts/m2) 2.33E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -3.026E-02 (2.0E-02)
Z/L AT 10 METERS -0.564 (10.02)	SEN. HEAT FLUX (Watts/m2) 4.75E-00 (3.0E+00)	ROUGHNESS LENGTH (Meters) 1.346E-07 (6.0E-05)
MONIN-OBUKHOV LENGTH (Meters) 1.773E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 3.048E-03 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.37E-01 (3.0E+01)	
	BOWEN RATIO (no units) 0.227 (10.08)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "BEST" ESTIMATES.

GRAD. RICH. NO. AT 6M	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
63%	62%	4%	11%	54%	0%	1%	55%	10%	1%	74%	0%	66%

## MARINE SURFACE LAYER MEASUREMENT EXPERIMENT

NRL MICROMETEOROLOGY  
WIND TUNNEL, P.O. BOX 2  
MARINE SURFACE LAYER MEASUREMENT STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 2905100300  
START TIME: 3:00:00 PST  
STOP TIME: 3:05:00 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1981  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* OBSERVED DATA - RAW DATA (ORIGINALS) \*

NO. 00	NO. 01	NO. 02	NO. 03	NO. 04	NO. 05	NO. 06	NO. 07	NO. 08	NO. 09
SEA STATE	TEMP. SURF. 1	TEMP. SURF. 2	WIND DIR. 1	WIND DIR. 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
8.255	13.000	13.000	5.147	5.147	5.147	5.147	4.828	0.106	6.324
NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19
SEA STATE	TEMP. SURF. 1	TEMP. SURF. 2	WIND DIR. 1	WIND DIR. 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
8.255	13.000	13.000	5.147	5.147	5.147	5.147	4.828	0.106	6.324

## \* SURFACE CORRECTION DATA (ORIGINALS) \*

## \* ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS \*

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147

## \* SURFACE CORRECTION DATA (ORIGINALS) \*

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147

## \* OBSERVED DATA - TRANSLATED DATA (ORIGINALS) \*

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147

## \* OBSERVED DATA - TRANSLATED DATA (ORIGINALS) \*

NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9
WIND DIR. 1	WIND DIR. 2	WIND DIR. 3	WIND DIR. 4	WIND DIR. 5	WIND DIR. 6	WIND DIR. 7	WIND DIR. 8	WIND DIR. 9
5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147	5.147

## \* SURFACE CORRECTION DATA \*

RUN NUMBER: 2905100300  
START TIME: 3:00:00 PST  
STOP TIME: 3:05:00 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NRL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1981  
DATA SAMPLING RATE (ALL CHANNELS): 67/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1=UPPER LEVEL, 2=LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973) \*

STABILITY	FLUX PARAMETERS (UP/DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+/- INCL. WITH HEIGHT)
UNSTABLE (Stable/Unstable) 0.185 AT 0M	MOMENTUM FLUX (N/m <sup>2</sup> ) -1.13E-02	FRICITION VELOCITY (Meters/sec) 9.586E-02	GENERAL FORM: $DW/DZ = 1/(N1-N2) \cdot 1/(1+(Z1/Z2)^2) \cdot (Z1 \cdot Z2)^{1/2}$	GENERAL FORM: $N1 \cdot SLOPE = 1/(N1-N2) \cdot 1/(1+(Z1/Z2)^2) \cdot (Z1 \cdot Z2)^{1/2}$
GEOMETRIC HEAT HEIGHT (Meters) $GMH = (Z1 \cdot Z2)^{1/2} / 12.99$	HUMIDITY FLUX (kg/sec m <sup>2</sup> ) 9.27E-06	SCALING SPEC. HUMID. (kg/kg) 7.858E-03	N= WIND SPEED (m/sec) Z= HEIGHT (Meters) $DW/DZ = 1.36E-02$	N= WIND SPEED (M/sec) Z= HEIGHT (M) Vert. Axis $PS1 = PS11$ WS SLOPE = 4.17E 00
Z/L AT 0M 0.264	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.25E 01	SCALING POT. TEMP. (Kelvin) 7.858E-03	N= SPEC. HUMIDITY (kg/kg) Z= HEIGHT (Meters) $DSH/DZ = -8.92E-06$	N= SPEC. HUMIDITY (kg/kg) Z= HEIGHT (M) Vert. Axis $PS1 = PS12$ SH SLOPE = -6.81E 03
Z/L AT 10 METERS 0.157	SIN. HEAT FLUX (Watts/m <sup>2</sup> ) 9.38E 01	ROUGHNESS LENGTH (Meters) 0.328E-08	N= POT. TEMP. (Kelvin) Z= HEIGHT (Meters) $DPT/DZ = -8.92E-04$	N= POT. TEMP. (Kelvin) Z= HEIGHT (M) Vert. Axis $PS1 = PS12$ PTR SLOPE = -6.81E 01
Z/L AT Z1 0.144	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.47E 01	DRAW COEFF. AT 10 METERS (Dimensionless) 4.359E-03		N= LAYER STRUCT. (KxM-2/3) Z= HEIGHT (M) Vert. Axis $PS1 = PS12$ PTR SLOPE = NO DATA
MINOR DECKWAVE LENGTH (Meters) -6.194E 01	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 3.86E 01			
POT. AT Z1 0.552674	DOWN RATIO (no units) 0.64			
POT. AT Z2 1.553146				
POT. AT Z3 1.567455				
POT. AT Z4 1.579548				

## \* GENERAL CONSTANTS \*

GRAVITATION CONSTANT  
(M/sec<sup>2</sup>)  
9.80665

PROF. TOL. SCHMIDT NUMBER  
0.74

BULK SOLE HEAT TRANSFER COEFF.  
0.92E 01

## \* MISCELLANEOUS \*

ATR DENSITY  
(kg/m<sup>3</sup>)  
1.2303

## \* GENERAL NOTES \*

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by inversion of:

SHI SHI = 1.00E 03 Kg/Kg  
PTR PTR = 1.00E 03 Kel

ATR SPECIFIC HEAT  
(J/cal./kg K)  
2.416E 02  
WATER LAT. HEAT VAP.  
(J/cal./kg)  
5.934E 05

RUN NUMBER: 7905100300  
 START TIME: 01:00 PM  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 Min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	VIR-WT TEMP (Kelvin)	V.POT-WT TEMP (Kelvin)
12.360	2.23	10.44	NO DATA	1013.28	13.476	-1.116	-1.618	0.237	0.335
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V.POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin/2/3)
10.39	10.458	13.715	13.811	9.590E-03	88.04	7.793E-03	12.637	14.354	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEDL ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (Stable, Unstable) 2.884 AT GHH	MOMENTUM FLUX (N/m2) -4.75E-03	FRICTION VELOCITY (Meter/sec) 6.213E-02	WITH LONG. VELOCITY (Meter/2/sec2) -3.860E-03	AIR DENSITY (Kg/m3) 1.2305
GEOMETRIC MEAN HEIGHT (Meter) GHH-(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 6.17E-06	SCALING SPEC. HUMID. (Kg/Kg) -8.071E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 6.170E-06	AIR SPECIFIC HEAT (J/Kcal /Kg) 2.4160E-02
Z/L AT GHH 2.040	LAT. HEAT FLUX (Watts/m2) 1.52E-01	SCALING POT. TEMP. (Kelvin) -8.580E-02	WITH POT. TEMPERATURE (Meter Kelvin/sec) 4.091E-03	WATER LAT. HEAT VAP. (J/Kcal /Kg) 5.9630E-05
Z/L AT 10 METERS 2.340	SUN. HEAT FLUX (Watts/m2) 5.09E-00	ROUGHNESS LENGTH (Meter) 1.357E-10		VAP. PRES. AT WT LEVEL (Millibar) 15.460
ROUGHNESS LENGTH (Meters) -4.274E-06	SEA AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01	DRAW COEF. AT 10 METERS (Dimensionless) 7.771E-04		ABS. HUMID. AT WT LEVEL (Kg/m3) 1.169E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.51E-01			BAR. PRES. AT WT LEVEL (Millibar) 1014.48
	BOWEN RATIO (no units) 0.334			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SEA RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
20%	20%	15%	19%	19%	1%	11%	39%	76%	12%	12%	96%	15%
17%	17%	46%	47%	10%	1%	26%	10%	23%	70%	130%	43%	40%

\* CONTINUED BELOW

RUN NUMBER: 7905100300  
 START TIME: 01:00 PM  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 Min

\* ESTIMATED PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES, WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (Stable, Unstable) 2.882 AT GHH	MOMENTUM FLUX (N/m2) -4.75E-03 (1.6E-02)	FRICTION VELOCITY (Meter/sec) 6.999E-02 (1.6E-02)
GEOMETRIC MEAN HEIGHT (Meter) GHH-(Z1+Z2)/2 12.79	HUMIDITY FLUX (Kg/sec m2) 6.17E-06 (1.8E-06)	SCALING SPEC. HUMID. (Kg/Kg) -7.999E-05 (1.3E-05)
Z/L AT GHH 2.042 (1.6E-02)	LAT. HEAT FLUX (Watts/m2) 1.67E-01 (2.0E-01)	SCALING POT. TEMP. (Kelvin) 3.599E-02 (2.0E-02)
Z/L AT 10 METERS 2.333 (1.6E-02)	SUN. HEAT FLUX (Watts/m2) 3.63E-00 (1.6E-00)	ROUGHNESS LENGTH (Meter) 2.599E-09 (1.6E-09)
ROUGHNESS LENGTH (Meters) -4.274E-06	SEA AND SOLAR HEAT FLUX (Watts/m2) 1.47E-01 (2.0E-01)	DRAW COEF. AT 10 METERS (Dimensionless) 1.56E-04 (1.6E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 3.52E-01 (1.6E-01)	
	BOWEN RATIO (no units) 0.331 (1.6E-01)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY WHATEVER (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GHH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SUN. HEAT FLUX	SEA RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SOL. SPEC. HUMIDITY	SOL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
8%	3%	6%	2%	6%	0%	6%	6%	2%	1%	81%	6%	136%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 7905100330  
START TIME: 3:34:20 PST  
END TIME: 4:23:30 PST  
START DATE: 13 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 4711 CHANNELS/2 MIN  
DATA AVERAGING PERIOD: 24 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-DOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VOLT):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR
0.265	0.000	0.001	5.096	5.148	1.645	1.590	4.026	0.000	0.000

No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
BULK WT. TEMP.	AC. EXPOS. ONLY	AC. VOLT. TAG	MANUAL FLAG	ZERO REF. A	SPARE A	SPARE B	CH. T. K. REF. B
3.000	3.916	2.945	0.001	0.001	0.001	0.001	0.000

## \* DIGITAL CHANNEL RAW DATA (AVERAGE): ESCAPEMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCAPEMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR		UPWIND 1 AND	UPWIND 2 AND	UPWIND 3 AND	UPWIND 4 AND	UPWIND 5 AND	UPWIND 6 AND
AIR TEMP. 1	AIR TEMP. 2	H-10M/LENGTH		POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL
1411.123378	1421.124158	0.001		0.001	0.001	0.001	0.001	0.001	0.001

## \* SYSTEM HOUSEKEEPING PARAMETERS TRANSMITTED INTO ENGINEERING UNIT:

MANUAL FLAG	ERROR COUNT	DATA BASE	VOLT. REF. DIV	VOLT. REF. DIV	VOLT. REF. DIV	VOLT. REF. DIV	VOLT. REF. DIV	VOLT. REF. DIV	VOLT. REF. DIV
(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)	(No. scans)
0	0	108	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCAPEMENT CORRECTIONS) TRANSMITTED INTO ENGINEERING UNIT:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR	BAR. PRES. 1	SKY RAD.	BULK WT. TEMP.	WIND DIR
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(deg. True)
12.338	3.01	10.12	NO DATA	158.5	1012.15	1.491.01	14.002	158.5

AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2
(Celsius)	(Meter/sec)	(Celsius)	(Celsius)	(Meter ASL)	(Millibar)
12.420	3.00	10.07	NO DATA	-0.67	1013.35

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	REL. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REL. HUMID. 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Percent)
18.35	12.518	13.662	13.042	9.381E-03	86.32	7.636E-03	12.366	14.318	NO DATA

HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	REL. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REL. HUMID. 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m <sup>3</sup> )	(Percent)	(kg/kg)	(Millibar)	(Millibar)	(Percent)
9.20	12.510	13.740	13.030	9.353E-03	85.24	7.611E-03	12.377	14.411	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905100330  
START TIME: 3:34:20 PST  
START DATE: 13 May 1979 (DAY 130)

MARINE SURFACE LAYER  
MICROMETEOROLOGICAL  
SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE: 4711 CHANNELS/2 MIN  
DATA AVERAGING PERIOD: 24 MIN  
NOMENCLATURE: 1-UPPER LEVEL, 2-DOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BOSINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPE (+UP, -DOWN)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.166	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -1.02E-02	FRICTION VELOCITY (Meters/sec) 9.972E-02	GENERAL FORM: DN/DZ = (N1-N2)/[1/n(Z1/Z2)] (Z1*Z2)/Z1	GENERAL FORM: N SLOPE = [(N2-Z1)/(Z1-Z2)] (N1-N2)
GEOMETRIC MEAN HEIGHT (Meters) (Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec. m <sup>2</sup> ) 9.51E-06	SCALING SPEC. HUMID. (Kg/Kg) 7.751E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 1.55E-02	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PS1=PS11 WS SLOPE = 4.01E-00
Z/L AT GND -0.181	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 2.35E-01	SCALING POT. TEMP. (Kelvin) 7.751E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = -8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PS1=PS12 SH SLOPE = 6.91E-03
Z/L AT Z1 -0.146	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 9.62E-01	ROUGHNESS LENGTH (Meters) 1.269E-07	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PS1=PS12 PTK SLOPE = 6.91E-01
Z/L AT Z2 -0.128	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 1.47E-01	DRAG COEFF. AT 10 METERS (Dimensionless) 1.835E-03	N=TEMP. STRUCT. PARAM. 2/3 Z=HEIGHT (M) Vert. Axis PS1=PS11 DT2 SLOPE=NO DATA	N=TEMP. STRUCT. PARAM. 2/3 Z=HEIGHT (M) Vert. Axis PS1=PS11 DT2 SLOPE=NO DATA
MINIMUM OBSTRUCTION LENGTH (Meters) -7.165E-01	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) 3.91E-01			
PS11 AT Z1: 0.518579 PS11 AT Z2: 0.325135 PS12 AT Z1: 0.342866 PS12 AT Z2: 0.210344	ROSEN RATIO (no. units) 0.641			

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (N) units	GRAVITATION ACCELERATION (M/sec. 2)	PROFILI TUP. PRANATI NUMBER	PROFILI TUP. SCHMIDT NUMBER	BULK TRANF. COEFF. 0.97E-03	BULK MOISTURE TRANSF. COEFF. 1.32E-03
0.4	9.7909	0.74	0.74		

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 +/- 0.08E-3 Kg/Kg.  
PTK1 PTK2 +/- 0.08 Kel.

## \* MISCELLANEOUS:

AIR DENSITY (kg/m <sup>3</sup> )
1.2301

AIR SPECIFIC HEAT (J/Kg. K)
2.4164E-02

WATER LAT. HEAT CAP (J/Kg. K)
5.9031E-05

RUN NUMBER: 7905100330  
 START TIME: 3:34:20 P.M.  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kel./m-2/3)	BAR. PRES. (Millibar)	BULK WT TEMP (Celsius)	AIR-WT TEMP (Kelvin)	POT-WT TEMP (Kelvin)	UIR-WT TEMP (Kelvin)	V. POT WT TEMP (Kelvin)
12.410	3.10	10.07	NO DATA	1013.25	13.502	-1.092	-0.994	0.208	0.306

HEIGHT (Meters)	POT. TEMP. (Celsius)	UIR. TEMP. (Celsius)	V. POT. TEMP. (Celsius)	ABS. HUMID. (Kg/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kg/Kg)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kel./m-2/3)
10.30	12.508	13.730	13.828	9.357E-03	85.63	7.605E-03	12.332	14.401	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERR'D STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERR'D SCALING PARAMETERS	INFERR'D MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.129 AT GMH	MOMENTUM FLUX (Nt/m2) -9.83E-03	FRICTION VELOCITY (Meters/sec) 8.949E-02	WITH LONG. VELOCITY (Meter2/sec2) -8.069E-03	AIR DENSITY (Kg/m3) 1.2304
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.79	HUMIDITY FLUX (Kg/sec m2) 9.60E-06	SCALING SPEC. HUMID. (Kg/Kg) -8.722E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 9.604E-06	AIR SPECIFIC HEAT (ITcal./Kg Kel.) 2.4164E 02
Z/L AT GMH -1.202	LAT. HEAT FLUX (Watts/m2) 2.37E 01	SCALING POT. TEMP. (Kelvin) -5.400E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 4.833E-03	WATER LAT. HEAT VAP. (ITcal./Kg) 5.9631E 05
Z/L AT 10 METERS -0.925	SEN. HEAT FLUX (Watts/m2) 6.02E 00	ROUGHNESS LENGTH (Meters) 3.786E-08		VAP. PRES. AT WT LEVEL (Millibar) 15.486
MONIN-OBUKHOV LENGTH (Meters) -1.681E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E 01	DRAW COEF AT 10 METERS (Dimensionless) 8.345E-04		ABS HUMID. AT WT LEVEL (Kg/m3) 1.171E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.44E 01			BAR. PRES. AT WT LEVEL (Millibar) 1014.45
	BOWEN RATIO (no units) 0.253			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
242%	242%	188%	217%	217%	10%	131%	434%	94%	123%	123%	114%	188%
180%	180%	46%	45%	108%	10%	24%	153%	23%	68%	131%	43%	43%

\* CONTINUED BELOW

RUN NUMBER: 7905100330  
 START TIME: 3:34:20 P.M.  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 NRL MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAI

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 6/min  
 DATA AVERAGING PERIOD: 20 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN [ ]:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.715 [0.02] AT GMH	MOMENTUM FLUX (Nt/m2) -1.63E-02 [6.0E-02]	FRICTION VELOCITY (Meters/sec) 9.150E-02 [6.0E-02]
GEOMETRIC MEAN HEIGHT (Meter) GMH=(Z1*Z2)1/2 12.79	HUMIDITY FLUX (Kg/sec m2) 9.59E-06 [8.0E-06]	SCALING SPEC. HUMID. (Kg/Kg) -8.376E-05 [3.0E-05]
Z/L AT GMH -0.766 [0.02]	LAT. HEAT FLUX (Watts/m2) 2.37E 01 [2.0E+01]	SCALING POT. TEMP. (Kelvin) -3.613E-02 [2.0E-02]
Z/L AT 10 METERS 0.590 [0.02]	SEN. HEAT FLUX (Watts/m2) 4.33E 00 [3.0E+00]	ROUGHNESS LENGTH (Meters) 6.273E-08 [6.0E 05]
MONIN-OBUKHOV LENGTH (Meters) -1.695E 01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.47E 01 [2.0E+01]	DRAW COEF AT 10 METERS (Meters) 1.016E-03 [4.0E 04]
	TOTAL HEAT BUDGET FLUX (Watts/m2) 4.33E 01 [3.0E+01]	
	BOWEN RATIO (no units) 0.198 [0.08]	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE SIGNIFICANT DEVIATION WITH EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+or-":

GRAD. RICH. NO. AT GMH	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
68%	67%	2%	1%	61%	6%	7%	54%	7%	6%	77%	0%	54%

## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
NAVAL ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

## \* \* \* \* \* MICROMETEOROLOGICAL DATA \* \* \* \* \*

RUN NUMBER: 0905100400  
START TIME: 04:23:40 PST  
END TIME: 04:30:00 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No.00	No.01	No.02	No.03	No.04	No.05	No.06	No.07	No.08	No.09
VOL. REF. B	TEMP. STRUC.1	TEMP. STRUC.2	DW. POINT1	DW. POINT2	WIND SPEED1	WIND SPEED2	BAR. PRES.1	SKY RAD.	WIND DIR.
0.205	0.000	0.001	0.145	0.199	0.952	0.948	4.828	0.166	0.577
No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17		
BULK WT. TEMP.	HE. FREQUENCY	AL. VOLTAGE	MANUAL FLAG	ZFRD. REF.	SPARE A	SPARE B	VOLT. REF. B		
0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.205		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED (ESCARPMENT CORRECTIONS):

No.1	No.2	UPWIND MEAN	UPWIND (AND	OFFSHORE	OFFSHORE	WINDFALL	WINDFALL	WINDFALL	WINDFALL
AIR TEMP. 1	AIR TEMP. 2	HEIGHT/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.125042	1421.124450	0.106	57	-0.008	0.050	0.000	0.000	0.000	0.000

## \* SENSITIVITY PARAMETERS (TRANSLATED INTO ENGINEERING UNITS):

ANALOG	ANALOG	DATA	VOL. REF. B	VOL. REF. B	ZFRD. REF.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)	(No.0000)
0	0	160	0	0	0	0	0	11.4	57.66

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE GAIN AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED1	DW. POINT1	TEMP. STRUC.1	WIND DIR.	BAR. PRES.1	SKY RAD.	BULK WT. TEMP.	MEAN AIR TEMP.
(Celsius)	(Meters/sec)	(Celsius)	(Celsius)	(Meters/sec)	(Milibar)	(Milibar)	(Celsius)	(Celsius)
12.535	1.94	11.41	NO DATA	0.6	1017.28	1.461	13.517	285.519
AIR TEMP. 2	WIND SPEED2	DW. POINT2	TEMP. STRUC.2	TIDE GAUGE	BAR. PRES.2			
(Celsius)	(Meters/sec)	(Celsius)	(Celsius)	(Meters)	(Milibar)			
12.444	1.92	10.37	NO DATA	-0.57	1013.38			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VER. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/Kg)	(Percent)	(Kg/Kg)	(Milibar)	(Milibar)	(Kelvin 2/3)
10.35	12.535	13.705	15.835	9.563E-03	87.91	7.779E-03	12.611	14.335	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VER. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/Kg)	(Percent)	(Kg/Kg)	(Milibar)	(Milibar)	(Kelvin 2/3)
9.28	12.534	13.791	13.881	9.546E-03	87.17	7.759E-03	12.503	14.424	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 0905100400  
START TIME: 04:23:40 PST  
END TIME: 04:30:00 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NAVAL ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIF.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/min  
DATA AVERAGING PERIOD: 20 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BUSINGER, 1973):

STABILITY	FLUX PARAMETERS (UPPER, DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+/- INER WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+/- Stable, -Unstable) 0.336 AT GSH	MOMENTUM FLUX (Meters/m2) -4.59E-03	FRICTION VELOCITY (Meters/sec) 6.166E-02	GENERAL FORM: $DN/DZ = [(N1-N2)] / [(1+(Z1/Z2)^2)^{1/2}]$	GENERAL FORM: $N' SLOPE = [(LN(Z1-PSI) - (LN(Z2-PSI)) / (N1-N2)]$
GRAD. TRO. MEAN HEIGHT (Meters) GSH = $CZ1Z2^{1/2} / 1.2$ 12.077	HUMIDITY FLUX (Kg/sec m2) 7.06E-06	SCALING SPEC. HUMID. (Kg/Kg) 9.394E-05	N=WIND SPEED (M/sec) Z=HEIGHT (Meters) DSH/DZ = 6.03E-03	N=WIND SPEED (M/sec) Z=HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 6.55E-00
Z/L AT GSH 0.894	LAT. HEAT FLUX (Watt/m2) 1.24E-01	SCALING POT. TEMP. (Kelvin) -9.394E-03	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (Meters) DSH/DZ = 8.92E-06	N=SPEC. HUMIDITY (Kg/Kg) Z=HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = -5.75E-03
Z/L AT 10 METERS -0.088	SKY HEAT FLUX (Watt/m2) 7.14E-01	ROUGHNESS LENGTH (Meters) 9.75E-01	N=POT. TEMP. (Kelvin) Z=HEIGHT (Meters) DPT/DZ = -8.92E-04	N=POT. TEMP. (Kelvin) Z=HEIGHT (M) Vert. Axis PSI=PSI2 PTK SLOPE = -5.75E-01
Z/L AT Z1 -1.253	SKY AND SOLAR HEAT FLUX (Watt/m2) 1.48E-01	DRAW COEF. AT 10 METERS (Dimensionless) 0.301E-03	N=TEMP. STRUC. (K/M 2/3) Z=HEIGHT (M) Vert. Axis PSI=NONL CT2 SLOPE=NO DATA	
Z/L AT Z2 0.633	TOTAL HEAT BUDGET FLUX (Watt/m2) 3.29E-01			
MINUT. DEBRUOV LENGTH (Meters) -1.453E-01	DOWN RATIO (No units) 0.041			
POT. AT Z1 = 1.029534 POT. AT Z2 = 0.862910 PSI1 AT Z1 = 0.014541 PSI2 AT Z2 = 0.584925				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec2)	PRANDTL NUMBER	PRANDTL NUMBER	REF. HEAT TRANS. COEF. (Watt/m2K)	BULK MOISTURE TRANSF. COEF. (M/sec)
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

AIR DENSITY  
(Kg/m3)  
1.2299

AIR SPECIFIC HEAT  
(J/Kg K)  
2.416E-02

WATER LAT. HEAT VAP.  
(J/Kg)  
5.9830E-05

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by interpolation of:

WSI WS2 = 0.009 of Mean Value.  
SHI SH2 = 0.006 of Mean Value.  
PTK1-PTK2 = 0.008 of Mean Value.

## \* CONTINUED ON NEXT PAGE

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 2.7/MIN  
DATA AVERAGING PERIOD: 20 MIN

AIR TEMP.	WIND SPEED	DW POINT	TEMP. STRUC.	BAR. PRES.	BULK WT TEMP	AIR WT TEMP	POT WT TEMP	VIN WT TEMP	V POT WT TEMP
(Celsius)	(m/sec)	(Celsius)	(Kel./m 2/3)	(Millibar)	(Celsius)	(Kelvin)	(Kelvin)	(Kelvin)	(Kelvin)
12.433	1.93	10.38	NO DATA	1013.28	13.517	-1.084	-0.994	0.263	0.361
HEIGHT	POT. TEMP.	VIN. TEMP.	V. POT. TEMP.	ABS. HUMID.	REL. HUMID.	SPEC. HUMID.	VAP. PRES.	S. VAP. PRES.	REF. INDEX
(meters)	(Celsius)	(Celsius)	(Celsius)	(kg/m3)	(Percent)	(g/kg)	(Millibars)	(Millibars)	(Kelvin m 2/3)
10.00	12.531	13.781	13.379	9.546-03	87.26	7.763-03	12.565	14.433	NO DATA

INFERRED STABILITY	FLUX PARAMETERS (+UP, =DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+ Stable, = Unstable) -4.25E-04 AT 60M	MOMENTUM FLUX (Nt/m2) -3.46E-03	FRICTION VELOCITY (Meters/sec) 5.301E-02	WITH LONG. VELOCITY (Meter2/sec2) -2.810E-03	AIR DENSITY (Kg/m3) 1.230E-03
GEOMETRIC MEAN HEIGHT (meter) 60M=(1*22)/1/2 12.5M	HUMIDITY FLUX (Kg/sec m2) 5.51E-06	SCALING SPEC. HUMID. (Kg/Kg) -8.455E-05	WITH ABS. HUMIDITY (Meter Kg/sec m3) 5.514E-06	AIR SPECIFIC HEAT (J/cal) (Kg Kel) 2.416E-02
VEL AT 60M (m/sec) 0.840E-01	LAT. HEAT FLUX (Watts/m2) 7.36E-01	SCALING POT. TEMP. (Kelvin) -7.670E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 3.748E-03	WATER LAT. HEAT VAP (J/cal) (Kg Kel) 5.902E-05
VEL AT 10 METERS (m/sec) 0.490E-01	SEN. HEAT FLUX (Watts/m2) 4.67E-00	ROUGHNESS LENGTH (Meters) 4.610E-12		VAP PRES. AT WT LEVEL (millibar) 15.50E-02
MOON ILLUMIN. LENGTH (meter) 10 0.107E-01	SKY AND SOLAR HEAT FLUX (Watts/m2) 1.40E-01	DRAW COEF. AT 10 METERS (Dimensionless) 7.571E-04		ABS HUMID AT WT LEVEL (Kg/m3) 1.172E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) 5.31E-01			BAR PRES. AT WT LEVEL (millibar) 1014.40
	HUMID RATIO (no. units) 0.34E-02			

GRAIN PERCENTAGE	ZINC PERCENTAGE	AMMONIUM FLUORIDE	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	ROWEN RATIO	FRICTION VELOCITY	SCL. SPEC HUMIDITY	SCL. POT. TEMP.	ROUGH. LENGTH	DRAG COEF.
300%	500%	504%	364%	364%	10%	193%	728%	182%	182% /	182%	202%	364%
100%	100%	46%	46%	109%	10%	25%	155%	23%	69%	132%	43%	40%

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 6/MIN  
DATA AVERAGING PERIOD: 28 MIN

[illegible]

TEST METHOD	TEST TYPE	NUMBER OF TESTS	COEFFICIENT OF FRICTION	SLIP SPEED (mm/sec)	SLIP DIST. (mm)	SLIP TIME (sec)	WATER RATIO	FRICTION VARIATION	SLIP SPEED FLUCTUATION	SLIP DIST. TEMP.	ROUGH LENGTH	DRAG COEF.
TEST 1	TEST 2	12	1.1	50	61	0.1	0.02	0.1	6.2	69.2	0.2	16.2

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## MARINE SURFACE LAYER MICROMETEOROLOGICAL EXPERIMENT

NAVAL RESEARCH LABORATORY  
ATMOSPHERIC PHYSICS BRANCH  
MARINE ATMOSPHERIC RESEARCH STATION  
SAN NICOLAS ISLAND, CALIFORNIA

\* \* \* METEOROLOGICAL DATA \* \* \*

RUN NUMBER: 7905100830  
START TIME: 8:59:40 PST  
END TIME: 9:29:30 PST  
START DATE: 10 May 1979 (DAY 130)

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (SEC CHANNELS): 0.7/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* ANALOG CHANNEL RAW DATA (AVERAGE VDC):

No. 00	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
VOLT. REF. A	TEMP. STRUCT. 1	TEMP. STRUCT. 2	DEW POINT 1	DEW POINT 2	WIND SPEED 1	WIND SPEED 2	BAR. PRES. 1	SKY RAD.	WIND DIR.
6.205	0.001	0.001	5.310	5.350	1.118	1.130	5.013	5.720	0.942
No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19
BULK WT. TEMP.	AC FREQUENCY	AC VOLTAGE	MANUAL FLAG	ERROR REF.	SOURCE A	SOURCE B	WIND PROFILE		
4.033	5.791	2.562	0.001	0.001	0.001	0.001	0.001		

## \* DIGITAL CHANNEL RAW DATA (AVERAGE):

## \* ESCARPMENT DATA, FIELD CALIBRATION AND WIND SPEED ESCARPMENT CORRECTIONS:

No. 1	No. 2	UPWIND NEAR	UPWIND LAND	OPTICAL	DIFF. CAL	WIND CAL	WSHFT	No. 11
AIR TEMP. 1	AIR TEMP. 2	UP (H)/LENGTH	PATH (meters)	(Volts)	(Volts)	(Volts)	(Volts)	(Volts)
1411.13448	1491.13582	0.112	0.0	0.045	0.050	0.000	0.594	0.900

## \* SYSTEM HOUSEKEEPING PARAMETERS (TRANSLATED INTO ENGINEERING UNITS):

MANUAL FLAG	ERROR COUNT	DATA RATE	VOLT. REF. DEV.	VOLT. REF. DEV.	WIND REF. DEV.	AC VOLT. FLUX	AC FREQ. FLUX	AC VOLTAGE	AC FREQUENCY
(No. scans)	(No. scans)	(No. scans)	A (No. 3.067V)	B (No. 3.067V)	(No. 3.067V)	(No. 3.067V)	(No. 3.067V)	(No. 3.067V)	(No. 3.067V)
0	0	178	0	0	0	0	0	0	0

## \* OBSERVED MICROMETEOROLOGICAL PARAMETERS (INCLUDING THE ABOVE CAL. AND ESCARPMENT CORRECTIONS) TRANSLATED INTO ENGINEERING UNITS:

AIR TEMP. 1	WIND SPEED 1	DEW POINT 1	TEMP. STRUCT. 1	WIND DIR. 1	BAR. PRES. 1	SKY RAD. 1	BULK WT. TEMP.	AC FREQ. 1
(Celsius)	(Meter/sec)	(Celsius)	(KELVIN-2/3)	(Deg. True)	(Millibar)	(Watt/m <sup>2</sup> )	(Celsius)	(Hz)
13.448	2.25	11.39	NO DATA	21.2	1015.12	7.90E-02	15.675	5.791
AIR TEMP. 2	WIND SPEED 2	DEW POINT 2	TEMP. STRUCT. 2	TIDE TABLE	BAR. PRES. 2			
(Celsius)	(Meter/sec)	(Celsius)	(KELVIN-2/3)	(Meter MSL)	(Millibar)			
13.583	2.18	11.33	NO DATA	0.34	1016.21			

## \* CALCULATED MICROMETEOROLOGICAL PARAMETERS:

HEIGHT, Z1	POT. TEMP. 1	VIR. TEMP. 1	V. POT. TEMP. 1	ABS. HUMID. 1	REL. HUMID. 1	SPEC. HUMID. 1	VAP. PRES. 1	S. VAP. PRES. 1	REF. INDEX 1
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
18.35	13.628	14.896	15.076	1.026E-02	87.36	0.307E-03	13.496	15.442	NO DATA
HEIGHT, Z2	POT. TEMP. 2	VIR. TEMP. 2	V. POT. TEMP. 2	ABS. HUMID. 2	REL. HUMID. 2	SPEC. HUMID. 2	VAP. PRES. 2	S. VAP. PRES. 2	REF. INDEX 2
(Meters)	(Celsius)	(Celsius)	(Celsius)	(Kg/m <sup>3</sup> )	(Percent)	(Kg/Kg)	(Millibar)	(Millibar)	(Kelvin-2/3)
9.20	13.673	15.025	15.115	1.016E-02	86.26	0.274E-03	13.451	15.595	NO DATA

## \* CONTINUED BELOW

RUN NUMBER: 7905100830  
START TIME: 8:59:40 PST  
START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
NKL MICROMETEOROLOGY  
SAN NICOLAS ISLAND, CAL.

PRINT DATE: 11 JUN 1980  
DATA SAMPLING RATE (ALL CHANNELS): 0.7/min  
DATA AVERAGING PERIOD: 30 min  
NOMENCLATURE: 1-UPPER LEVEL, 2-LOWER LEVEL

## \* PROFILE CALCULATIONS BASED ON ABOVE OBSERVED AND CALCULATED VALUES (BRINGER, 1973):

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS	PARTIAL DERIVATIVES	PROFILE SLOPES (+INCR. WITH HEIGHT)
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -0.938 AT GMM	MOMENTUM FLUX (Nt/m <sup>2</sup> ) -2.41E-02	FRICTION VELOCITY (meters/sec) 1.401E-01	GENERAL FORM: DN/DZ = ((N1-N2)/L1N(Z1/Z2)) * (Z1/Z2) <sup>1/2</sup>	GENERAL FORM: N1 SLOPE = (L1N2-PSI)-(L1N2-PSI) * (N1-N2)
GEOMETRIC MEAN HEIGHT (METER) GMM=(Z1+Z2)/2 12.77	HUMIDITY FLUX (Kg/sec m <sup>2</sup> ) 1.64E-05	SCALING SPEC. HUMID. (Kg/Kg) -9.511E-05	N-WIND SPEED (M/sec) Z-HEIGHT (Meters) DSH/DZ = -1.35E-02	N-WIND SPEED (M/sec) Z-HEIGHT (M) Vert. Axis PSI=PSI1 WS SLOPE = 2.86E-00
Z/L AT GMM -1.001	LAT. HEAT FLUX (Watts/m <sup>2</sup> ) 4.04E-01	SCALING POT. TEMP. (Kelvin) -5.351E-02	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (meters) DSH/DZ = -8.92E-06	N-SPEC. HUMIDITY (Kg/Kg) Z-HEIGHT (M) Vert. Axis PSI=PSI2 SH SLOPE = 5.68E-03
Z/L AT 10 METERS -0.771	SEN. HEAT FLUX (Watts/m <sup>2</sup> ) 7.32E-00	ROUGHNESS LENGTH (Meters) 2.187E-06	N-POT. TEMP. (Kelvin) Z-HEIGHT (meters) DPT/DZ = -5.02E-03	N-POT. TEMP. (Kelvin) Z-HEIGHT (M) Vert. Axis PSI=PSI3 PIK SLOPE = -1.01E-01
Z/L AT Z1 -1.414	SKY AND SOLAR HEAT FLUX (Watts/m <sup>2</sup> ) 7.98E-02	DRAW COEFF. AT 10 METERS (Dimensionless) 1.037E-02		N=LnTEMP. STRUCT. (KELVIN-2/3) Z-HEIGHT (M) Vert. Axis PSI=NONE CT2 SLOPE=NO DATA
Z/L AT Z2 -0.709	TOTAL HEAT BUDGET FLUX (Watts/m <sup>2</sup> ) -2.48E-02			
MONIN-ORUKHOV LENGTH (Meters) -1.298E-01	BOWEN RATIO (no units) 0.231			
PSI1 AT Z1 = 1.263021 PSI1 AT Z2 = 0.918746 PSI2 AT Z1 = 0.855450 PSI2 AT Z2 = 0.619683				

## \* GENERAL CONSTANTS:

VON KARMAN CONSTANT (No units)	GRAVITATION ACCELERATION (M/sec <sup>2</sup> )	PROFILE TEMP. GRADIENT NUMBER	PROFILE TEMP. GRADIENT NUMBER	BULK HEAT TRANSFER COEFF.	BULK MOISTURE TRANSFER COEFF.
0.4	9.7959	0.74	0.74	0.92E-03	1.32E-03

## \* MISCELLANEOUS

## \* GENERAL NOTES:

Accuracy limitation exceeded for measurement of Profile Slope and/or Partial Derivative.  
Computation executed by insertion of:

SH1 SH2 = +/- .00E+3 Kg/Kg.

AIR DENSITY  
(Kg/m<sup>3</sup>)  
1.228

AIR SPECIFIC HEAT  
(J/Kg K)  
2.4179E-02

WATER LAT. HEAT VAP  
(J/Kg)  
5.0967E-05



RUN NUMBER: 7905100830  
 START TIME: 8:59:40 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 2/min  
 DATA AVERAGING PERIOD: 30 min

\* ESTIMATED MICROMETEOROLOGICAL PARAMETERS AT TEN METERS:

AIR TEMP. (Celsius)	WIND SPEED (Meter/sec)	DEW POINT (Celsius)	TEMP. STRUC. (Kelvin-m/2/3)	BAR. PRES. (Millibar)	BULK WT TEMP. (Celsius)	AIR-WT TEMP. (Kelvin)	POT WT TEMP. (Kelvin)	VIR WT TEMP. (Kelvin)	V-POT WT TEMP. (Kelvin)
13.566	2.36	11.34	NO DATA	1016.12	13.675	-0.108	-0.010	1.335	1.435
HEIGHT (Meters)	POT. TEMP. (Celsius)	VIR. TEMP. (Celsius)	V-POT. TEMP. (Celsius)	ARS. HUMID. (Kq/m3)	REL. HUMID. (Percent)	SPEC. HUMID. (Kq/Kq)	VAP. PRES. (Millibars)	S. VAP. PRES. (Millibars)	REF. INDEX (Kelvin-m/2/3)
10.00	13.664	15.010	15.108	1.017E-02	66.39	8.275E-03	13.457	15.577	NO DATA

\* BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE ESTIMATED VALUES AT TEN METERS (FRIEHE ET AL, 1978):

INFERRED STABILITY	FLUX PARAMETERS (+UP, -DOWN)	INFERRED SCALING PARAMETERS	INFERRED MEAN VERTICAL VELOCITY COVARIANCE	MISCELLANEOUS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) -1.164 AT GMM	MOMENTUM FLUX (Nt/m2) -5.38E-03	FRICTION VELOCITY (Meters/sec) 8.618E-02	WITH LONG. VELOCITY (Meter2/sec2) -4.300E-03	AIR DENSITY (Kq/m3) 1.2264
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kq/sec m2) 5.29E-06	SCALING SPEC. HUMID. (Kq/Kq) -6.498E-05	WITH ARS. HUMIDITY (Meter Kq/sec m3) 5.78E-06	AIR SPECIFIC HEAT (Jcal./Kq) 2.4172E-02
Z/L AT GMM -1.232	LAT. HEAT FLUX (Watts/m2) 1.30E-01	SCALING POT. TEMP. (Kelvin) -3.056E-02	WITH POT. TEMPERATURE (Meter Kel./sec) 2.023E-03	WATER LAT. HEAT VAP. (Jcal./Kq) 5.8964E-05
Z/L AT 10 METERS -0.954	SEN. HEAT FLUX (Watts/m2) 2.52E-06	ROUGHNESS LENGTH (Meters) 4.420E-10		VAP. PRES. AT WT LEVEL (Millibar) 15.765
MONIN-OBUKHOV LENGTH (Meters) -1.049E-01	SKY AND SHAR. HEAT FLUX (Watts/m2) -7.98E-02	DRAW COEF. AT 10 METERS (Dimensionless) 7.859E-04		ARS. HUMID. AT WT LEVEL (Kq/m3) 1.186E-02
	TOTAL HEAT BUDGET FLUX (Watts/m2) -7.82E-02			BAR. PRES. AT WT LEVEL (Millibar) 1017.31
	BOWEN RATIO (no units) 0.193			

\* MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN PERCENT MEAN ERROR AS COMPUTED FROM CONSTITUENT MEASUREMENT ACCURACIES. TOP ROW ARE PROFILE ERROR VALUES AND BOTTOM ROW ARE BULK AERODYNAMIC ERROR VALUES. ALL VALUES ARE APPROXIMATE AND ARE "+/-%":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
125%	125%	182%	292%	146%	5%	12%	375%	91%	130%	55%	111%	182%
4936%	4936%	46%	50%	4864%	5%	16%	4916%	25%	70%	4892%	43%	40%

\* CONTINUED FLOW

RUN NUMBER: 7905100830  
 START TIME: 8:59:40 PST  
 START DATE: 10 May 1979 (DAY 130)

MARINE SURFACE LAYER  
 MRI MICROMETEOROLOGY  
 SAN NICOLAS ISLAND, CAL

PRINT DATE: 11 JUN 1980  
 DATA SAMPLING RATE (ALL CHANNELS): 2/min  
 DATA AVERAGING PERIOD: 30 min

\* COMPOSITE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUE WEIGHTED AS A FUNCTION OF THE ABOVE RESPECTIVE MEASUREMENT ERRORS WITH THE LOWER LIMIT OF THE CORRESPONDING MEASUREMENT UNCERTAINTY INDICATED IN PARENTHESIS:

STABILITY	FLUX PARAMETERS (+UP, -DOWN)	SCALING PARAMETERS
GRAD. RICHARDSON NUMBER (+Stable, -Unstable) 0.944 (0.02) AT GMM	MOMENTUM FLUX (Nt/m2) -9.15E-03 (6.0E-02)	FRICTION VELOCITY (Meters/sec) 8.102E-02 (6.0E-02)
GEOMETRIC MEAN HEIGHT (Meter) GMM=(Z1+Z2)/2 12.99	HUMIDITY FLUX (Kq/sec m2) 7.52E-06 (8.0E-06)	SCALING SPEC. HUMID. (Kq/Kq) 7.557E-05 (3.0E-05)
Z/L AT GMM 1.002 (0.02)	LAT. HEAT FLUX (Watts/m2) 1.01E-01 (2.0E+01)	SCALING POT. TEMP. (Kelvin) -5.325E-02 (2.0E-02)
Z/L AT 10 METERS 0.775 (0.12)	SEN. HEAT FLUX (Watts/m2) 9.12E-06 (3.0E+00)	ROUGHNESS LENGTH (Meters) 6.164E-07 (6.0E-06)
MONIN-OBUKHOV LENGTH (Meters) -1.290E-01	SKY AND SHAR. HEAT FLUX (Watts/m2) 7.90E-02 (2.0E+01)	DRAW COEF. AT 10 METERS (Meters) 2.511E-05 (4.0E-04)
	TOTAL HEAT BUDGET FLUX (Watts/m2) 7.65E-02 (3.0E+01)	
	BOWEN RATIO (no units) 0.228 (0.01)	

\* DIFFERENCE BETWEEN THE PROFILE AND BULK AERODYNAMIC DERIVED PARAMETER VALUES AS COMPUTED VIA THE STANDARD DEVIATION FROM EITHER THE ABOVE WEIGHTED COMPOSITE VALUE OR MEASUREMENT UNCERTAINTY VALUE (WHICH EVER ABSOLUTE VALUE IS LARGER). ALL VALUES ARE LISTED IN PERCENT DIFFERENCE AND ARE "+/-%":

GRAD. RICH. NO. AT GMM	Z/L AT 10M	MOMENTUM FLUX	LAT. HEAT FLUX	SEN. HEAT FLUX	SKY RAD. FLUX	TOTAL HEAT FLUX	BOWEN RATIO	FRICTION VELOCITY	SCAL. SPEC. HUMIDITY	SCAL. POT. TEMP.	ROUGH. LENGTH	DRAW COEF.
17%	16%	18%	81%	51%	6%	7%	11%	53%	21%	30%	2%	15%

\* END OF DATA RUN

#### 4. Aerosol Size Distribution Observations

Approximately 160 typically half hour averaged aerosol size distribution observations made at an altitude of 14.4 m are presented in tabular form. The observations were made by Dr. Richard Jeck of the Naval Research Laboratory with a Particle Measurement Systems (Knollenberg) model ASSP for particular sizes ranging from 0.3 to 14.0  $\mu\text{m}$  radius. The julian day number indicated in the table, minus 120, is equal to the May 1979 date. For example: Day 122 = 2 May 1979. The time of day indicated is the observation start time. The aerosol values in the table are expressed in units of  $\log_{10}$  [No. of particles/ $\text{cm}^3/\mu\text{m}$  (radius)]. The calibration data in Table 4.1 and the tabular data are presented courtesy of Gathman and Jeck (1981).

Table 4.1 — Calibration Values for the NRL Particle Measurement System Model ASSP

Size Channel Number	Range 4		Range 2	
	Radius at Center of Size Channel ( $\mu\text{m}$ )	Size Channel Width ( $\mu\text{m}$ )	Radius at Center of Size Channel ( $\mu\text{m}$ )	Size Channel Width ( $\mu\text{m}$ )
1	0.29	0.0048	0.58	0.037
2	0.37	0.042	0.86	0.28
3	0.47	0.147	1.36	0.85
4	0.55	0.250	2.9	2.5
5	0.63	0.360	3.8	1.6
6	0.72	0.315	4.8	1.9
7	0.79	0.115	5.9	1.7
8	0.86	0.14	7.0	1.25
9	1.0	0.195	8.0	1.60
10	1.15	0.25	9.0	1.45
11	1.36	0.30	10.0	1.8
12	1.6	0.325	11.0	1.25
13	1.85	0.38	12.0	1.1
14	2.15	0.22	13.0	1.0
15	2.45	0.20	14.0	1.0









## 5. Wave Period and Wave Height Observations

One hundred and seventy-one wave period and wave height observations made 15.6 km upwind of the micrometeorological observations in water approximately 100 m deep are presented in tabular form. The values presented are based upon measurements averaged by eye over a 3 min period. They were recorded in increments of 1 sec for wave period and 0.5 m for wave height. The observations were made by the Geophysics Division, Pacific Missile Test Center, Point Mugu, California, with a Datawell "Waverider" buoy model 6900. The data are presented courtesy of deViolini (1980).

## T. BLANC

Day	Approximate Time (PST)	Av. Wave Period (sec)	Av. Wave Height (meters)	Day	Approximate Time (PST)	Av. Wave Period (sec)	Av. Wave Height (meters)
1 May	12:00	8	0.5	4 May	22:00	11	1.5
	13:00	7	0.5		23:00	12	1.5
	14:00	9	0.5		00:00	12	1.0
	15:00	7	1.5		01:00	13	1.0
	16:00	7	2.0		02:00	11	1.0
	17:00	6	2.0		03:00	14	1.5
	18:00	6	2.0		04:00	11	1.5
	19:00	7	2.0		05:00	14	1.0
	20:00	7	2.0		06:00	13	1.0
	21:00	7	2.0		07:00	13	1.0
	22:00	7	2.0		08:00	13	1.0
	23:00	8	2.0		09:00	12	1.0
2 May	00:00	7	2.0		10:00	12	1.5
	01:00	6	2.5		11:00	12	1.5
	02:00	6	2.5		12:00	12	1.5
	03:00	7	2.0		13:00	11	1.5
	04:00	7	2.0		14:00	11	1.5
	05:00	7	2.0		15:00	11	1.5
	06:00	7	2.0		16:00	8	1.5
	07:00	8	2.0		17:00	12	1.5
	08:00	8	2.0		18:00	9	1.5
	09:00	7	2.0		19:00	13	1.0
	10:00	8	2.0		20:00	11	1.5
	11:00	8	2.0		21:00	13	1.5
	12:00	8	2.0		22:00	12	1.0
	13:00	8	2.0		23:00	12	1.5
	14:00	8	2.0	5 May	00:00	14	1.0
	15:00	8	2.0		01:00	13	1.0
	16:00	8	2.0		02:00	13	1.0
	17:00	9	1.5		03:00	15	1.0
	18:00	7	2.0		04:00	20	1.0
	19:00	6	2.0		05:00	11	1.5
	20:00	6	2.0		06:00	7	1.0
	21:00	8	2.0		07:00	6	1.5
	22:00	6	2.0		08:00	5	2.0
	23:00	8	2.0		09:00	9	2.0
					10:00	8	2.0
3 May	00:00	8	2.0		11:00	7	3.0
	01:00	8	2.0		12:00	7	2.0
	02:00	7	2.0		13:00	7	1.5
	03:00	7	2.0		14:00	8	2.0
	04:00	8	1.5		15:00	6	2.0
	05:00	8	1.5		16:00	8	1.5
	06:00	8	1.5		17:00	8	1.5
	07:00	9	1.0		18:00	8	1.5
	08:00	10	1.0	7 May	06:00	9	2.0
	09:00	11	1.0		07:00	10	2.0
	10:00	11	1.0		08:00	12	1.5
	11:00	11	1.0		09:00	9	2.0
	12:00	10	1.0		10:00	10	2.0
	13:00	10	1.0		11:00	10	2.0
	14:00	10	1.0		12:00	10	2.0
	15:00	10	1.0		13:00	8	1.5
	16:00	11	1.5		14:00	9	2.0
	17:00	13	1.0		15:00	9	2.0
	18:00	9	1.5		16:00	12	2.0
	19:00	11	1.5		17:00	11	2.5
	20:00	11	1.5				
	21:00	12	1.5				



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Day	Approximate Time (PST)	Av. Wave Period (sec)	Av. Wave Height (meters)	Day	Approximate Time (PST)	Av. Wave Period (sec)	Av. Wave Height (meters)
8 May	18:00	11	2.5	9 May	00:00	9	3.0
	19:00	11	2.0		01:00	8	2.5
	20:00	11	2.0		02:00	8	2.5
	21:00	11	2.0		03:00	8	2.5
	22:00	11	2.0		04:00	9	2.5
	23:00	11	2.0		05:00	8	3.0
	00:00	11	2.0		06:00	9	4.0
	01:00	10	2.0		07:00	9	4.0
	02:00	10	2.0		08:00	9	4.0
	03:00	10	2.0		09:00	9	3.5
	04:00	9	2.0		10:00	9	3.5
	05:00	10	2.0		11:00	9	3.5
	06:00	9	2.0		12:00	—	—
	07:00	10	1.5		13:00	—	—
	08:00	12	2.0		14:00	—	—
	09:00	10	1.5		15:00	11	2.5
	10:00	11	2.0		16:00	—	—
	11:00	9	2.0		17:00	—	—
	12:00	9	2.0		18:00	—	—
	13:00	9	2.0		19:00	6	2.0
	14:00	8	2.0		20:00	8	2.0
	15:00	8	2.0		21:00	8	2.0
	16:00	8	2.0		22:00	7	2.5
	17:00	8	3.0		23:00	8	2.0
	18:00	8	2.5	10 May	00:00	9	3.0
	19:00	8	2.5		01:00	8	2.0
	20:00	8	3.5		02:00	8	2.0
	21:00	8	2.5		03:00	8	2.0
	22:00	9	3.0		04:00	8	2.0
	23:00	9	3.0		05:00	8	2.0
					06:00	9	1.0
					07:00	9	1.0
					08:00	9	1.5
					09:00	9	1.5
					10:00	—	—
					11:00	—	—
					12:00	—	—

## 6. Atmospheric Radon Observations

Fifty-nine hourly atmospheric radon ( $^{222}\text{Rn}$ ) observations taken at a height of 5.3 m are presented in tabular form. The values presented are based upon measurements typically sampled for 20 min. The observations were made by Dr. Richard Jeck of the Naval Research Laboratory with a device described by Larson (1973). Values less than  $5 \text{ pCi}/\text{m}^3$  are believed to be typically indicative of an air mass of open ocean origin and values greater than  $50 \text{ pCi}/\text{m}^3$  are typically indicative of an air mass of coastal origin. The tabular data are presented courtesy of Larson (1980).

<u>Day</u>	<u>Approximate StartTime(PST)1979</u>	<u>Radon (<math>\text{pCi}/\text{m}^3</math>)</u>	<u>Day</u>	<u>Approximate StartTime(PST)1979</u>	<u>Radon (<math>\text{pCi}/\text{m}^3</math>)</u>
1 May	12:00	2.0	7 May	10:00	2.2
	13:00	1.9		11:00	1.8
	14:00	2.3		12:10	2.0
	15:00	1.8		14:00	1.5
	17:00	1.6	8 May	07:05	0.8
	18:00	2.3		08:00	0.8
	19:00	2.0		09:05	1.5
2 May	08:00	4.9		10:05	6.0
	09:00	6.3		11:00	9.0
	10:00	6.6		12:05	1.2
	11:00	5.6		13:00	1.3
	12:00	5.3		14:00	0.8
	13:00	6.0		18:00	1.0
	14:00	7.1		19:00	1.0
	15:00	6.4		20:00	2.4
	17:00	6.8	9 May	07:20	6.9
	18:00	6.9		08:00	6.7
3 May	19:00	9.7		09:00	7.5
	08:00	14.0		10:05	6.4
	09:00	17.0		12:00	8.2
	10:00	18.0		13:00	4.1
	11:00	18.2		14:10	5.5
	12:00	18.1		18:05	5.5
	13:00	12.4		19:00	4.5
	14:10	5.8	10 May	07:15	10.7
4 May	18:30	7.3		08:20	15.1
	08:00	32.0		09:10	18.0
	09:00	25.5		10:00	14.7
	10:00	24.7			
	11:00	27.2			
	12:00	16.8			

**7. Inversion-Base Height Observations**

Twenty inversion-base height observations launched 2.1 km downwind from the micrometeorological observations are presented in tabular form. The observations were made by the Geophysics Division, Pacific Missile Test Center, Point Mugu, California, with a National Weather Service radiosonde model J005 modified to take 10 readings/min. The data are presented courtesy of deViolini (1980).

<u>Day</u>	<u>Approx. Launch Time (PST)</u>	<u>Height of Lowest Inversion Base (meters)</u>
1 May	07:00	230
	13:50	510
2 May	07:30	520
	15:30	810
3 May	08:00	660
	14:30	670
4 May	07:50	540
	14:20	540
5 May	06:50	480
	11:00	630
	14:50	590
	18:50	500
7 May	08:00	1,150
	13:40	1,100
8 May	07:00	330
9 May	06:50	370
	11:30	420
	14:50	270
10 May	09:40	130
	13:30	140

## 8. Statistics for the Micrometeorological Observations

PARAMETER* SYMBOL	No. OF DATA RUNS	PARAMETER MIN. VALUE	DATE & TIME OF MIN. VALUE	PARAMETER MAX. VALUE	DATE & TIME OF MAX. VALUE	PARAMETER MEAN VALUE	PARAMETER STD. DEVIATION
AH1	272	7.123E-03	08 May 14:00	1.062E-02	05 May 17:30	9.047E-03	6.525E-04
AH2	272	7.259E-03	08 May 14:00	1.019E-02	05 May 02:30	9.056E-03	5.984E-04
AH3	272	1.147E-02	05 May 05:30	1.215E-02	01 May 15:30	1.177E-02	1.315E-04
AIRD	270	1.223E-00	05 May 17:00	1.239E-00	03 May 23:30	1.230E-00	3.787E-03
AIRDB	272	1.223E-00	05 May 17:00	1.239E-00	03 May 23:30	1.231E-00	3.757E-03
AT1	272	1.144E-01	08 May 06:30	1.420E-01	05 May 15:30	1.248E-01	5.753E-01
AT2	272	1.151E-01	08 May 06:30	1.423E-01	05 May 15:30	1.257E-01	5.606E-01
ATB	272	1.150E-01	08 May 06:30	1.422E-01	05 May 15:30	1.256E-01	5.622E-01
ATKM	272	2.846E-02	08 May 06:30	2.874E-02	05 May 15:30	2.857E-02	5.675E-01
ATWTB	272	-2.051E-00	08 May 06:30	6.039E-01	05 May 16:30	-1.014E-00	4.985E-01
BP1	272	1.008E-03	08 May 17:30	1.017E-03	04 May 10:00	1.013E-03	2.581E-00
BP2	272	1.010E-03	08 May 17:30	1.019E-03	04 May 10:00	1.014E-03	2.581E-00
BPB	272	1.009E-03	08 May 17:30	1.018E-03	04 May 10:00	1.014E-03	2.581E-00
BPM	272	1.009E-03	08 May 17:30	1.018E-03	04 May 10:00	1.013E-03	2.581E-00
BPM	272	1.011E-03	08 May 17:30	1.020E-03	04 May 10:00	1.015E-03	2.581E-00
BR	270	-1.024E-00	09 May 16:30	3.639E-01	03 May 12:00	2.239E-02	2.184E-01
BRB	272	-8.571E-02	05 May 17:00	3.424E-01	10 May 04:00	1.613E-01	8.007E-02
DFBR	270	2.282E-01	03 May 11:00	3.534E-02	09 May 06:30	6.284E-01	7.001E-01
DFDRAG	270	1.452E-01	08 May 02:30	2.266E-02	10 May 08:30	3.111E-01	2.964E-01
DFFRIC	270	5.157E-02	05 May 14:00	5.307E-01	10 May 08:30	1.234E-01	1.824E-01
DFHEFX	270	4.889E-01	09 May 21:30	5.941E-02	09 May 09:30	7.205E-01	9.921E-01
DFLHFX	270	1.746E-01	09 May 20:30	6.142E-02	01 May 15:30	4.215E-01	1.009E-02
DFMOFX	270	8.788E-02	05 May 14:00	6.382E-01	08 May 18:30	2.129E-01	1.743E-01
DFRI	270	1.293E-00	03 May 13:00	2.659E-02	08 May 05:30	5.574E-01	4.626E-01
DFRUFL	270	9.229E-05	10 May 04:00	7.491E-01	01 May 19:30	2.816E-01	2.311E-01
DFSLPT	270	8.994E-03	09 May 00:30	2.052E-02	09 May 08:00	5.634E-01	4.377E-01
DFSLSH	270	7.690E-02	03 May 10:00	3.508E-02	04 May 09:00	3.530E-01	7.138E-01
DFSR	270	0.000E-00	01 May 15:30	0.000E-00	01 May 15:30	0.000E-00	0.000E-00
DFTHFX	270	2.844E-02	04 May 12:30	2.239E-02	08 May 17:00	1.527E-01	2.578E-01
DFZOLT	270	1.217E-00	03 May 13:00	3.617E-02	08 May 05:30	5.504E-01	4.054E-01
DP1	272	6.145E-00	08 May 14:00	1.207E-01	05 May 17:30	9.546E-00	1.083E-00
DP2	272	6.405E-00	08 May 14:00	1.133E-01	05 May 02:30	9.544E-00	9.900E-01
DPB	272	6.374E-00	08 May 14:00	1.140E-01	05 May 17:30	9.545E-00	9.997E-01
DPTDZ	272	-7.925E-03	03 May 12:00	2.231E-02	09 May 16:30	-3.582E-04	4.955E-03
DRAG	270	1.982E-04	05 May 15:30	1.037E-02	10 May 08:30	2.214E-03	1.478E-03
DRAGB	272	7.571E-04	10 May 04:00	1.746E-03	08 May 15:30	1.225E-03	2.110E-04
DSHDZ	272	-1.476E-05	08 May 13:00	1.038E-04	01 May 17:00	-5.442E-06	1.221E-05
DWSDZ	272	-1.610E-02	04 May 08:30	2.558E-01	08 May 17:00	7.739E-02	5.653E-02
EBR	272	1.169E-02	01 May 17:00	9.452E-02	04 May 10:30	2.804E-02	9.902E-01
EBRB	272	1.226E-02	08 May 06:30	1.724E-04	07 May 13:00	2.688E-02	1.130E-03
EDRAC	272	4.697E-01	08 May 17:00	5.250E-02	04 May 11:00	1.169E-02	6.050E-01
EDRACB	272	4.000E-01	01 May 15:30	4.000E-01	01 May 15:30	4.000E-01	0.000E-00
EFRICB	272	2.300E-01	01 May 15:30	2.300E-01	01 May 15:30	2.300E-01	0.000E-00
EFRICV	272	2.348E-01	08 May 17:00	2.625E-02	04 May 11:00	5.846E-01	3.825E-01
HEFLX	272	3.376E-01	08 May 17:00	4.525E-02	04 May 10:30	1.156E-02	5.746E-01
HEFLXB	272	8.360E-01	08 May 06:30	1.719E-04	07 May 13:00	2.252E-02	1.130E-03
ELHFLX	272	5.183E-01	01 May 17:00	4.927E-02	04 May 10:30	1.648E-02	4.668E-01
ELHFLXB	272	3.652E-01	08 May 14:00	5.729E-01	05 May 02:30	4.353E-01	3.587E-00
EMOFLX	272	4.697E-01	08 May 17:00	5.250E-02	04 May 11:00	1.169E-02	6.050E-01
EMOFLXB	272	4.600E-01	01 May 15:30	4.600E-01	01 May 15:30	4.600E-01	0.000E-00
ERI	272	4.909E-01	08 May 17:00	3.000E-02	10 May 04:00	1.391E-02	5.046E-01
ERIB	272	1.556E-02	08 May 06:30	1.726E-04	07 May 13:00	2.962E-02	1.130E-03
ERUFL	272	4.348E-01	08 May 17:00	2.825E-02	04 May 11:00	7.846E-01	3.025E-01
ERUFLB	272	4.300E-01	01 May 15:30	4.300E-01	01 May 15:30	4.300E-01	0.000E-00
ESCLPT	272	9.385E-00	08 May 16:00	1.913E-02	04 May 10:30	5.713E-01	3.589E-01
ESCLSH	272	1.387E-01	01 May 17:00	2.315E-02	04 May 10:30	1.063E-02	2.134E-01
ESLPTB	272	1.066E-02	08 May 06:30	1.721E-04	07 May 13:00	2.482E-02	1.130E-03
ESLSHB	272	5.952E-01	08 May 14:00	8.029E-01	05 May 02:30	6.653E-01	3.587E-00
ESR	272	5.069E-00	09 May 12:00	2.435E-01	04 May 05:30	7.968E-00	2.927E-00
ESRB	272	5.069E-00	09 May 12:00	2.435E-01	04 May 05:30	7.968E-00	2.927E-00
ETHFLX	272	7.729E-00	05 May 15:30	2.097E-02	04 May 05:30	7.849E-01	5.095E-01
ETHFLXB	272	5.471E-00	05 May 11:30	4.333E-01	07 May 13:00	2.289E-01	1.273E-01
EZOLT	272	5.211E-01	08 May 17:00	3.000E-02	10 May 04:00	1.452E-02	4.937E-01
EZOLTB	272	1.556E-02	08 May 06:30	1.726E-04	07 May 13:00	2.972E-02	1.130E-03
FRICV	270	6.106E-02	10 May 04:00	1.277E-00	08 May 17:00	4.135E-01	2.781E-01
FRICVB	272	5.301E-02	10 May 04:00	7.668E-01	08 May 15:30	3.237E-01	1.402E-01
HEFLX	270	-1.275E-02	08 May 16:30	5.218E-01	09 May 03:00	1.834E-00	2.417E-01
HEFLXB	272	-5.316E-00	05 May 17:00	2.956E-01	08 May 22:00	1.207E-01	6.844E-00
HUFLX	270	-4.231E-04	01 May 17:00	1.388E-04	08 May 13:00	2.372E-05	4.714E-05
HUFLXB	272	5.282E-06	10 May 08:30	9.963E-05	08 May 15:30	3.423E-05	1.937E-05
LHFLX	270	-1.045E-03	01 May 17:00	3.430E-02	08 May 13:00	5.863E-01	1.144E-02
LHFLXB	272	1.304E-01	10 May 08:30	2.462E-02	08 May 15:30	8.459E-01	4.788E-01
LHV	272	5.893E-05	05 May 15:30	5.908E-05	08 May 06:30	5.902E-05	3.208E-02
LHVB	272	5.893E-05	05 May 15:30	5.908E-05	08 May 06:30	5.902E-05	3.178E-02
MOFLX	270	-1.999E-00	08 May 17:00	0.000E-00	01 May 15:30	-3.058E-01	4.454E-01
MOFLXB	272	-6.123E-01	08 May 15:30	0.000E-00	01 May 15:30	-1.529E-01	1.287E-01
MOL	270	-1.897E-04	08 May 18:00	5.297E-03	08 May 13:00	-4.810E-02	1.720E-03
MOLB	272	-3.874E-03	05 May 10:00	3.632E-03	05 May 11:30	-2.711E-02	6.561E-02
OPTIR1	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
OPTIR2	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
OPTIR3	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
PSI121	270	-1.759E-00	05 May 15:30	1.336E-00	03 May 09:00	9.344E-02	3.517E-01
PSI122	270	-8.820E-01	05 May 15:30	9.805E-01	03 May 09:00	6.465E-02	2.096E-01
PSI221	270	-2.377E-00	05 May 15:30	9.043E-01	03 May 09:00	1.047E-02	3.614E-01
PSI222	270	-1.192E-00	05 May 15:30	6.622E-01	03 May 09:00	1.595E-02	1.972E-01
PT1	272	1.162E-01	08 May 06:30	1.438E-01	05 May 15:30	1.266E-01	5.753E-01
PT2	272	1.160E-01	08 May 06:30	1.432E-01	05 May 15:30	1.266E-01	5.606E-01
PTB	272	1.160E-01	08 May 06:30	1.432E-01	05 May 15:30	1.266E-01	5.622E-01

\*See pp. 564-581

# NRL MEMORANDUM REPORT 4713

PARAMETER* SYMBOL	No. OF DATA RUNS	PARAMETER MIN. VALUE	DATE & TIME OF MIN. VALUE	PARAMETER MAX. VALUE	DATE & TIME OF MAX. VALUE	PARAMETER MEAN VALUE	PARAMETER STD DEVIATION
PTKBLP	270	8.617E-01	08 MAY 18:00	1.137E-02	04 MAY 06:00	-2.290E-01	4.004E-01
PTWTP	272	-1.953E-00	06 MAY 06:30	7.019E-01	05 MAY 16:30	-9.160E-01	4.985E-01
REHL	270	0.000E-00	04 MAY 08:30	2.070E-01	04 MAY 05:00	1.797E-01	2.010E-02
RH1	272	6.374E-01	08 MAY 14:00	9.322E-01	05 MAY 02:30	8.245E-01	5.644E-00
RH2	272	6.428E-01	08 MAY 14:00	9.217E-01	05 MAY 02:30	8.193E-01	5.294E-00
RHB	272	6.466E-01	08 MAY 14:00	9.230E-01	05 MAY 02:30	8.199E-01	5.317E-00
RI	272	-2.712E-00	04 MAY 11:00	1.044E-01	05 MAY 15:30	-6.600E-02	2.578E-01
RIB	272	-4.264E-00	10 MAY 04:00	1.607E-02	05 MAY 15:30	-1.914E-01	5.403E-01
RUFL	270	9.751E-11	10 MAY 04:00	3.698E-03	08 MAY 20:00	5.668E-04	1.047E-03
RUFLB	272	4.610E-12	10 MAY 04:00	1.439E-03	08 MAY 15:30	1.985E-04	2.873E-04
SCLPT	270	-7.411E-02	03 MAY 12:00	9.179E-02	08 MAY 16:00	-6.579E-03	2.860E-02
SCLPTB	272	-7.070E-02	10 MAY 04:00	1.230E-02	05 MAY 16:30	-3.239E-02	1.510E-02
SCLSH	270	-1.020E-04	08 MAY 13:00	6.581E-04	01 MAY 17:00	-4.375E-05	7.745E-05
SCLSHB	272	-1.240E-04	08 MAY 14:00	0.000E-00	01 MAY 15:30	-8.306E-05	1.501E-05
SDBR	270	5.069E-04	03 MAY 11:00	5.821E-01	09 MAY 16:30	8.581E-02	9.864E-02
SDDRAG	270	1.718E-06	08 MAY 02:30	5.691E-03	10 MAY 08:30	5.760E-04	7.379E-04
SDFRIC	270	1.589E-04	05 MAY 14:00	3.270E-01	08 MAY 18:30	5.521E-02	7.391E-02
SDHEFX	270	3.768E-02	07 MAY 13:30	8.323E-01	08 MAY 16:30	7.479E-00	1.226E-01
SDLHFX	270	8.566E-02	03 MAY 03:30	5.750E-02	01 MAY 17:00	2.272E-01	5.171E-01
SDHOFX	270	1.021E-04	05 MAY 14:00	7.403E-01	08 MAY 18:30	8.354E-02	1.620E-01
SDRI	270	4.713E-04	07 MAY 14:00	1.766E-00	10 MAY 04:00	7.390E-02	2.290E-01
SDRUFL	270	5.537E-11	10 MAY 04:00	1.419E-03	08 MAY 18:30	1.933E-04	3.855E-04
SDSLPT	270	3.476E-06	09 MAY 00:30	7.678E-02	08 MAY 16:00	1.608E-02	1.590E-02
SDSLSH	270	6.175E-08	03 MAY 10:00	4.407E-04	01 MAY 17:00	2.163E-05	4.215E-05
SDSR	270	0.000E-00	01 MAY 15:30	0.000E-00	01 MAY 15:30	0.000E-00	0.000E-00
SDTHFX	270	7.332E-02	04 MAY 17:30	6.557E-02	01 MAY 17:00	2.806E-01	5.907E-01
SDZOLT	270	4.585E-04	08 MAY 09:00	1.424E-00	10 MAY 04:00	6.270E-02	1.856E-01
SH1	272	5.816E-03	08 MAY 14:00	8.691E-03	05 MAY 17:30	3.57E-03	5.250E-04
SH2	272	5.921E-03	08 MAY 14:00	8.274E-03	05 MAY 02:30	7.353E-03	4.793E-04
SHB	272	5.908E-03	08 MAY 14:00	8.314E-03	05 MAY 17:30	7.354E-03	4.839E-04
SHSLOP	270	-1.881E-04	09 MAY 16:30	1.805E-04	04 MAY 06:00	-7.094E-03	4.486E-03
SPHEAT	272	2.413E-02	08 MAY 14:00	2.418E-02	05 MAY 17:30	2.416E-02	1.080E-01
SPHEATB	272	2.413E-02	08 MAY 14:00	2.418E-02	05 MAY 17:30	2.416E-02	1.045E-01
SR	270	-1.009E-03	09 MAY 12:00	1.478E-01	10 MAY 04:00	-2.290E-02	3.277E-02
SUP1	272	1.346E-01	08 MAY 06:30	1.618E-01	05 MAY 15:30	1.447E-01	5.571E-01
SUP2	272	1.354E-01	08 MAY 06:30	1.622E-01	05 MAY 15:30	1.457E-01	5.475E-01
SUPB	272	1.353E-01	08 MAY 06:30	1.622E-01	05 MAY 15:30	1.456E-01	5.486E-01
THFLX	270	-1.288E-03	01 MAY 17:00	2.989E-02	08 MAY 16:30	-1.685E-02	3.701E-02
THFLXB	272	-9.291E-02	05 MAY 11:30	2.374E-02	08 MAY 17:00	-1.332E-02	3.229E-02
TIDE	272	-7.919E-01	10 MAY 02:00	7.301E-01	09 MAY 19:30	-3.960E-02	3.487E-01
TUR1	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
TUR2	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
TURSLOP	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
TURT	272	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
UMPL	270	0.000E-00	04 MAY 08:30	1.564E-02	09 MAY 01:30	9.982E-01	2.886E-01
UP1	272	9.401E-00	08 MAY 14:00	1.407E-01	05 MAY 17:30	1.193E-01	8.679E-01
UP2	272	9.582E-00	08 MAY 14:00	1.345E-01	10 MAY 08:30	1.193E-01	7.955E-01
UPB	272	9.560E-00	08 MAY 14:00	1.348E-01	05 MAY 17:30	1.193E-01	8.029E-01
UPT1	272	1.275E-01	08 MAY 06:30	1.577E-01	05 MAY 15:30	1.394E-01	6.146E-01
UPT2	272	1.273E-01	08 MAY 06:30	1.566E-01	05 MAY 15:30	1.394E-01	5.935E-01
UPTB	272	1.273E-01	08 MAY 06:30	1.567E-01	05 MAY 15:30	1.394E-01	5.959E-01
UPTWTP	272	-8.198E-01	08 MAY 06:30	2.073E-00	05 MAY 16:30	3.615E-01	5.441E-01
UPV	272	1.516E-01	05 MAY 05:30	1.611E-01	01 MAY 15:30	1.557E-01	1.840E-01
UT1	272	1.257E-01	08 MAY 06:30	1.559E-01	05 MAY 15:30	1.376E-01	6.146E-01
UT2	272	1.264E-01	08 MAY 06:30	1.557E-01	05 MAY 15:30	1.385E-01	5.935E-01
UTB	272	1.263E-01	08 MAY 06:30	1.557E-01	05 MAY 15:30	1.384E-01	5.959E-01
UTWTP	272	-9.178E-01	08 MAY 06:30	1.975E-00	05 MAY 16:30	2.635E-01	5.441E-01
VUHC	272	5.282E-06	10 MAY 08:30	9.963E-05	08 MAY 15:30	3.423E-05	1.937E-05
VULC	272	-4.996E-01	08 MAY 15:30	0.000E-00	01 MAY 15:30	-1.244E-01	1.049E-01
VUPTC	272	-4.294E-03	05 MAY 17:00	2.379E-02	08 MAY 22:00	9.694E-03	5.509E-03
WD	272						
WDBR	270	-3.433E-01	09 MAY 17:00	2.895E-01	10 MAY 04:00	1.077E-01	1.183E-01
WDBRAG	270	8.431E-04	04 MAY 06:00	3.708E-03	08 MAY 18:30	1.557E-03	6.867E-04
WDFRIC	270	5.391E-02	10 MAY 04:00	9.679E-01	08 MAY 17:00	3.632E-01	1.991E-01
WMHEFX	270	-9.154E-01	08 MAY 16:30	4.365E-01	09 MAY 03:00	5.826E-00	1.776E-01
WMHUFX	270	-1.684E-04	01 MAY 17:00	1.041E-04	08 MAY 13:00	3.104E-05	2.583E-05
WMHUFX	270	-4.159E-02	01 MAY 17:00	2.573E-02	08 MAY 13:00	7.671E-01	6.383E-01
WMHOFX	270	-1.263E-00	08 MAY 17:00	0.000E-00	01 MAY 15:30	-2.207E-01	2.719E-01
WMHOL	270	-2.919E-05	05 MAY 08:30	4.995E-04	05 MAY 08:00	-8.728E-02	1.847E-04
WMRI	270	-2.976E-00	10 MAY 04:00	6.814E-02	05 MAY 15:30	-1.114E-01	3.112E-01
WMUFL	270	2.091E-11	10 MAY 04:00	2.468E-03	08 MAY 17:30	3.703E-04	6.445E-04
WMSLPT	270	-6.727E-02	03 MAY 12:00	8.418E-02	08 MAY 16:00	-1.301E-02	2.701E-02
WMSLSH	270	-1.114E-04	08 MAY 13:00	5.289E-04	01 MAY 17:00	-6.346E-05	5.649E-05
WMSB	270	-1.009E-03	09 MAY 12:00	1.478E-01	10 MAY 04:00	-2.290E-02	3.277E-02
WMTWFX	270	-9.822E-02	05 MAY 11:30	2.515E-02	08 MAY 19:00	-1.423E-02	3.345E-02
WMZOL	270	-3.135E-00	10 MAY 04:00	1.319E-01	05 MAY 15:30	-1.221E-01	3.307E-01
WMZOL	270	-2.413E-00	10 MAY 04:00	1.016E-01	05 MAY 15:30	-9.393E-02	2.546E-01
WU1	272	1.942E-00	10 MAY 04:00	1.851E-01	08 MAY 15:30	9.617E-00	3.618E-00
WU2	272	1.924E-00	10 MAY 04:00	1.669E-01	08 MAY 15:30	8.924E-00	3.140E-00
WU3	272	1.926E-00	10 MAY 04:00	1.691E-01	08 MAY 15:30	9.008E-00	3.197E-00
WU4	270	3.132E-01	08 MAY 17:00	6.551E-00	10 MAY 04:00	1.402E-00	9.230E-01
WU5	272	1.315E-01	05 MAY 05:30	1.414E-01	01 MAY 15:30	1.358E-01	1.880E-01
WU6	270	1.141E-00	03 MAY 09:00	3.743E-01	15 MAY 15:30	-7.064E-02	2.167E-01
WU7	270	8.092E-01	03 MAY 09:00	1.877E-01	05 MAY 15:30	-3.541E-02	1.086E-01
WU8	270	1.143E-00	03 MAY 09:00	2.650E-01	05 MAY 15:30	5.032E-02	1.534E-01
WU9	270	4.485E-00	10 MAY 04:00	2.329E-02	05 MAY 15:30	-2.089E-01	5.691E-01
WU10	270	9.796E-01	03 MAY 09:00	2.040E-01	05 MAY 15:30	-3.849E-02	1.181E-01
WU11	270	1.467E-00	10 MAY 04:00	1.792E-02	05 MAY 15:30	1.608E-01	4.380E-01

9. Micrometeorological Shorthand Symbol<sup>†</sup> to Disk Storage Variable Label Conversion Table

10-digit run number\* (year, month, day, hour, minutes) = D(20)

AIRD	= P(54)	ELHFXB	= B(99)	RUFL	= P(50)	VVLC	= B(35)
AIRDB	= R(54)	EMOFLX	= B(90)	RUFLB	= B(50)	VVPTC	= B(38)
AH1	= P(21)	EMOFXB	= B(102)	SCLPT	= P(52)	WD	= P(11), B(11)
AH2	= P(22)	ERI	= B(82)	SCLPTB	= B(52)	WMBR	= S(9)
AHB	= B(26)	ERIB	= B(108)	SCLSH	= P(51)	WMDRAG	= S(14)
AHW	= B(62)	ERUFL	= B(86)	SCI SHB	= B(51)	WMFRIC	= S(10)
AT1	= P(1), B(1)	ERUFLB	= B(104)	SDJR	= S(26)	WMHEFX	= S(6)
AT2	= P(2), B(2)	ESCLPT	= B(89)	SDDRAG	= S(31)	WMHUFEX	= S(4)
ATB	= B(13)	ESCLSH	= B(87)	SDFRIC	= S(27)	WMLHFX	= S(5)
ATKM	= P(14)	ESLPTB	= B(106)	SDHEFX	= S(23)	WMMOFX	= S(3)
ATWTB	= B(18)	ESLSHB	= B(105)	SDLHFX	= S(22)	WMMOL	= S(15)
BP1	= P(77)	ESR	= B(94)	SDMOFX	= S(21)	WMRI	= S(1)
BP2	= P(10), B(10)	ESRB	= B(100)	SDRI	= S(19)	WMRUFL	= S(13)
BPB	= P(78)	ETHFLX	= B(95)	SDRUFL	= S(30)	WMSLPT	= S(12)
BPM	= P(79)	ETHFXB	= B(101)	SDSLPT	= S(29)	WMSLSH	= S(11)
BPW	= P(80)	EZOLT	= B(83)	SDSLSH	= S(28)	WMSR	= S(7)
BR	= P(39)	EZOLTB	= B(107)	SDSR	= S(24)	WMTHFX	= S(8)
BRB	= B(39)	FRICV	= P(49)	SDTHFX	= S(25)	WMZOL	= S(16)
DFBR	= S(41)	FRICVB	= B(49)	SDZOLT	= S(20)	WMZOLT	= S(2)
DFDRAG	= S(46)	GMH	= P(64), B(64)	SH1	= P(25)	WS1	= P(5), B(5)
DFFRIC	= S(42)	HEFLX	= P(57)	SH2	= P(26)	WS1EC	= P(75)
DFHEFX	= S(38)	HEFLXB	= B(57)	SHB	= B(28)	WS2	= P(6), B(6)
DFLHFX	= S(37)	HUFLX	= P(56)	SHSLOP	= P(60)	WS2EC	= P(76)
DFMOFX	= S(36)	HUFLXB	= B(56)	SPHEAT	= P(71)	WSB	= B(14)
DFRI	= S(34)	LHFLX	= P(81)	SPHEATB	= B(71)	WSSLOP	= P(59)
DFRUFL	= S(45)	LHFLXB	= B(81)	SR	= P(12), B(12)	WTB	= P(9), B(9)
DFSCLPT	= S(44)	LHV	= P(13)	SVP1	= P(19)	WTBFCAL	= P(74)
DFSLSH	= S(43)	LHVB	= B(60)	SVP2	= P(20)	Z1	= P(65)
DFSR	= S(39)	MOFLX	= P(55)	SVPB	= B(30)	Z2	= P(66)
DFTHFX	= S(40)	MOFLXB	= B(55)	THFLX	= P(58)	ZB	= P(16), B(22)
DFZOLT	= S(35)	MOL	= P(42)	THFLXB	= B(58)	Z1OL	= P(43)
DP1	= P(3), B(3)	MOLB	= B(42)	TTABLE	= P(68)	Z2OL	= P(44)
DP1FCAL	= P(72)	OPTIR1	= P(27)	TUR1	= P(7), B(7)	ZOL	= P(41)
DP2	= P(4), B(4)	OPTIR2	= P(26)	TUR2	= P(8), B(8)	ZOLB	= B(41)
DP2FCAL	= P(73)	OPTIRT	= B(31)	TURSLOP	= P(63)	ZOLT	= P(70)
DPB	= B(15)	PSI1Z1	= P(45)	TURT	= B(16)	ZOLTB	= B(70)
DPTDZ	= P(37)	PSI1Z2	= P(46)	UWPL	= P(62)		
DRAG	= P(69)	PSI2Z1	= P(47)	VP1	= P(17)		
DRAGB	= B(69)	PSI2Z2	= P(48)	VP2	= P(18)		
DSHDZ	= P(36)	PT1	= P(31)	VPB	= B(29)		
DWSDZ	= P(35)	PT2	= P(32)	VPT1	= P(33)		
EBR	= B(91)	PTB	= B(23)	VPT2	= P(34)		
EBRB	= B(98)	PTKSLOP	= P(61)	VPTB	= B(25)		
EDRAG	= B(85)	PTWTB	= B(19)	VPTWTB	= B(21)		
EDRAGB	= B(96)	REHL	= P(38)	VPW	= B(61)		
EFRICB	= B(103)	RH1	= P(23)	VT1	= P(29)		
EFRICV	= B(84)	RH2	= P(24)	VT2	= P(30)		
EHEFLX	= B(92)	RHB	= B(27)	VTB	= B(24)		
EHEFLXB	= B(97)	RI	= P(40)	VTWTB	= B(20)		
ELHFLX	= B(93)	RIB	= B(40)	VVHC	= B(36)		

<sup>†</sup>See pp. 564-581

\*See footnote p. 2

10. Disk Storage Variable Label to Micrometeorological Shorthand Symbol<sup>†</sup> Conversion Table

D(20) = 10 digit run number\* (year, month, day, hour, minutes).

P(1) = AT1	B(1) = AT1	S(1) = WMRI	P(61) = PTKSLOP	B(61) = VPW
P(2) = AT2	B(2) = AT2	S(2) = WMZOLT	P(62) = UWPL	B(62) = AHW
P(3) = DP1	B(3) = DP1	S(3) = WMMOFX	P(63) = TURSLOP	
P(4) = DP2	B(4) = DP2	S(4) = WMHUFEX	P(64) = GMH	B(64) = GMH
P(5) = WS1	B(5) = WS1	S(5) = WMLHFX	P(65) = Z1	
P(6) = WS2	B(6) = WS2	S(6) = WMHEFX	P(66) = Z2	
P(7) = TUR1	B(7) = TUR1	S(7) = WMSR		
P(8) = TUR2	B(8) = TUR2	S(8) = WMTHFX	P(68) = TTABLE	
P(9) = WTB	B(9) = WTB	S(9) = WMBR	P(69) = DRAG	B(69) = DRAGB
P(10) = BP2	B(10) = BP2	S(10) = WMFRIC	P(70) = ZOLT	B(70) = ZOLTB
P(11) = WD	B(11) = WD	S(11) = WMSLSH	P(71) = SPHEAT	B(71) = SPHEATB
P(12) = SR	B(12) = SR	S(12) = WMSLPT	P(72) = DPIFCAL	
P(13) = LHV	B(13) = ATB	S(13) = WMRUFL	P(73) = DF2FCAL	
P(14) = ATKM	B(14) = WSB	S(14) = WMDRAG	P(74) = WTBFCAL	
	B(15) = DPB	S(15) = WMMOL	P(75) = WS1EC	
	B(16) = TURT	S(16) = WMZOL	P(76) = WS2EC	
P(16) = ZB			P(77) = BP1	
P(17) = VP1			P(78) = BPB	
P(18) = VP2	B(18) = ATWTB		P(79) = BPM	
P(19) = SVP1	B(19) = PTWTB	S(19) = SDR1	P(80) = BPW	
P(20) = SVP2	B(20) = VTWTB	S(20) = SDZOLT	P(81) = LHFLX	B(81) = LHFLXB
P(21) = AH1	B(21) = VPTWTB	S(21) = SDMOFX		B(82) = ERI
P(22) = AH2	B(22) = ZB	S(22) = SDLHFX		B(83) = EZOLT
P(23) = RH1	B(23) = PTB	S(23) = SDHEFX		B(84) = EFRICV
P(24) = RH2	B(24) = VTB	S(24) = SDSR		B(85) = EDRAG
P(25) = SH1	B(25) = VPTB	S(25) = SDTHFX		B(86) = ERUFL
P(26) = SH2	B(26) = AHB	S(26) = SDBR		B(87) = ESCLSH
P(27) = OPTIR1	B(27) = RHB	S(27) = SDFRIC		
P(28) = OPTIR2	B(28) = SHB	S(28) = SDSLSH		B(89) = ESCLPT
P(29) = VT1	B(29) = VPB	S(29) = SDSLPT		B(90) = EMOFLX
P(30) = VT2	B(30) = SVPB	S(30) = SDRUFL		B(91) = EBR
P(31) = PT1	B(31) = OPTIRT	S(31) = SDDRAG		B(92) = EHEFLX
P(32) = PT2				B(93) = ELHFLX
P(33) = VPT1				B(94) = ESR
P(34) = VPT2		S(34) = DFRI		B(95) = ETHFLX
P(35) = JWSZDZ	B(35) = VVLC	S(35) = DFZOLT		B(96) = EDRAGB
P(36) = LSHDZ	B(36) = VVHC	S(36) = DFMOFX		B(97) = EHEFXB
P(37) = DPTDZ		S(37) = DFLHFX		B(98) = EBRB
P(38) = REHL	B(38) = VVPTC	S(38) = DFHEFX		B(99) = ELHFXB
P(39) = BR	B(39) = BRB	S(39) = DFRS		B(100) = ESRB
P(40) = RI	B(40) = RIB	S(40) = DFTHFX		B(101) = ETHFXB
P(41) = ZOL	B(41) = ZOLB	S(41) = DFBR		B(102) = EMOFXB
P(42) = MOL	B(42) = MOLB	S(42) = DFFRIC		B(103) = EFRICB
P(43) = Z1OL		S(43) = DFSLSH		B(104) = ERUFLB
P(44) = Z2OL		S(44) = DFSLPT		B(105) = ESLSHB
P(45) = PSI1Z1		S(45) = DFRUFL		B(106) = ESLPTB
P(46) = PSI1Z2		S(46) = DFDrag		B(107) = EZOLTB
P(47) = PSI2Z1				B(108) = ERIB
P(48) = PSI2Z2				
P(49) = FRICV	B(49) = FRICVB			
P(50) = RUFL	B(50) = RUFLB			
P(51) = SCLSH	B(51) = SCLSHB			
P(52) = SCLPT	B(52) = SCLPTB			
P(54) = AIRD	B(54) = AIRDB			
P(55) = MOFLX	B(55) = MOFLXB			
P(56) = HUFLX	B(56) = HUFLXB			
P(57) = HEFLX	B(57) = HEFLXB			
P(58) = THFLX	B(58) = THFLXB			
P(59) = WSSLOP				
P(60) = SHSLOP	B(60) = LHV B			

<sup>†</sup>See pp. 564-581

\*See footnote p. 2

## 11. Glossary of Micrometeorological Shorthand Symbols and Calculations

[May 1979 Data]

## General Rules for Notation

AIRD	AIR Density
AH	Absolute Humidity
AT	Air Temperature
BP	Barometric Pressure
BR	Bowen Ratio
$D \square \square \square$	Incremental change in $\square \square \square$ equivalent to the calculated error.
$D \square \square \square \frac{\partial \square \square}{\partial Z}$	$\frac{\partial \square \square}{\partial Z}$ , the partial derivative of $\square \square$ with respect to height (z)
DF $\square \square \square$	Difference between the profile and bulk derived $\square \square \square$ values as computed by the standard deviation from the composite error weighted mean.
DP	Dew Point in °C
DRAG	DRAG coefficient (neutral) computed for 10 m altitude
E $\square \square \square$	Error (approximate) as computed from constituent measurement uncertainties for $\square \square \square$ .
FRICV or FRIC	FRICtion Velocity
GG $\square \square \square$	Goff-Gratch Constant $\square \square$
GMH	Geometric Mean Height
HEFLX or HEFX	HEat (sensible) FLuX
HUFLX or HUFx	HUmidity FLuX
LHFLX or LHFX	Latent Heat FLuX
LHV	Latent Heat of Vaporization
MOFLX or MOFX	MOmentum FLuX
MOL	Monin-Obukhov Length
N( ) <sub>n</sub>	digital channel Number ( ), character n
OPTIR	OPTical Refractive Index ( $C_n^2$ )
PS11Z $\square$	$\psi_1$ , wind speed log profile stability correction at Z $\square$ height
PS12Z $\square$	$\psi_2$ , temperature and humidity log profile stability correction at height Z $\square$
PT	Potential Temperature in °C
RH	Relative Humidity
RI	Richardson (gradient) number stability
RUFL	Roughness Length
SCL $\square \square \square \square$ or SL $\square \square \square \square$	SCaLing $\square \square \square \square$ parameter.
SD $\square \square \square$	Standard Deviation of the profile and bulk derived $\square \square \square$ values from the composite error weighted mean.
SH	Specific Humidity
SPHEAT	SPecific HEAT
SR	Sky and solar short wave Radiation heat flux
SVP	Saturated Vapor Pressure
THFLX or THFX	Total Heat budget FLuX (sky & solar short wave + sensibl. + latent)
TUR	microthermal TURbulence temperature structure parameter ( $C_t^2$ )
V( )	average raw data Voltage for analog channel ( )
V'( )	average field calibration corrected Voltage for analog channel ( )
VKC	Von Kármán Constant; set equal to 0.4
VP	Vapor Pressure
VPT	Virtual Potential Temperature in °C
VT	Virtual Temperature in °C
VV $\square \square \square$ C	Vertical Velocity and $\square \square$ Covariance
WD	Wind Direction
WM $\square \square \square \square$	composite error Weighted Mean of the profile and bulk derived $\square \square \square$ values.
WS	Wind Speed
WTB	Water Temperature (Bulk)
Z	height above escarpment surface which is considered to be equivalent to height above water



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## ZOL

□ □ □ 1  
 □ □ □ 2  
 □ □ □ B  
 □ □ □ D  
 □ □ □ EC  
 □ □ □ FCAL  
 □ □ K  
 □ □ □ M  
 □ □ □ SLOP or □ □ □ SL  
 □ □ □ T  
 □ □ □ W  
 □ □ □ WTB

Z Over L (Z/L or ζ) stability parameter  
 upper height value for □ □ □  
 lower height value for □ □ □  
 Bulk aerodynamic derived value or ten meter height value for □ □ □  
 vertical profile Differential value for □ □ □  
 Escarpment Coefficient correction for □ □ □  
 Field CALibration correction for □ □ □  
 value of □ □ in °K  
 geometric Mean height value for □ □ □  
 profile SLOPe for □ □ □  
 Ten meter height value for □ □ □  
 Water level (or mean sea level) height value for □ □ □  
 □ □ □ at ten meter height minus the Water Temperature (Bulk)

## Notation Description Listing

Listed below in alphabetical order are the definitions of the English shorthand notation symbols (with units) employed in the computer calculations.

<u>Symbol:</u>	<u>Units:</u>	<u>Description:</u>
A	—	Variable in quadratic solution for profile derived Z/L (or ζ) stability parameter when Richardson's number > 0.
A1	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z1 height.
A2	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z2 height.
AB	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the 10 meter height.
AIRD	kg/m <sup>3</sup>	Air density of moist air at the geometric mean height (GMH).
AIRDB	kg/m <sup>3</sup>	Air density of moist air at the 10 meter height.
AH1	kg/m <sup>3</sup>	Absolute humidity (or water vapor density) at the Z1 height.
AH2	kg/m <sup>3</sup>	Absolute humidity (or water vapor density) at the Z2 height.
AHB	kg/m <sup>3</sup>	Absolute humidity (or water vapor density) at the 10 meter height.
AHW	kg/m <sup>3</sup>	Absolute humidity (or water vapor density) estimated at water level by assuming the dew point temperature is equal to the water temperature.
arctan( )	radians	Arctangent of ( ).
AT1	°C	Air temperature in °C at the Z1 height.
AT2	°C	Air temperature in °C at the Z2 height.
ATB	°C	Air temperature in °C at the 10 meter height.
ATK1	°K	Air temperature in °K at the Z1 height.

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ATK2	°K	Air temperature in °K at the Z2 height.
ATKB	°K	Air temperature in °K at the 10 meter height.
ATKM	°K	Air temperature in °K at the geometric mean height (GMH).
ATM	°C	Air temperature in °C at the geometric mean height (GMH).
ATWTB	°K	Air temperature at the 10 meter height minus the bulk water temperature.
AW	—	Intermediate step in Goff-Gratch formulation of vapor pressure at water level.
B	—	Variable in quadratic solution for profile derived Z/L (or $\zeta$ ) stability parameter when Richardson's number > 0.
B1	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z1 meter height.
B2	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z2 height.
BB	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the 10 meter height.
BP1	mb	Barometric pressure estimated for the Z1 height
BP2	mb	Barometric pressure <i>measured</i> at the Z2 height.
BPB	mb	Barometric pressure estimated for the ten meter height (ZB).
BPM	mb	Barometric pressure estimated for the geometric mean height (GMH).
BPW	mb	Barometric pressure estimated for mean sea level height.
BR	—	Profile derived Bowen Ratio.
BRB	—	Bulk aerodynamic derived Bowen Ratio.
BW	—	Intermediate step in Goff-Gratch formulation of vapor pressure at water level.
C	—	Variable in quadratic solution for profile derived Z/L (or $\zeta$ ) stability parameter when Richardson's number > 0.
C1	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z1 height.
C2	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z2 height.
CB	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the 10 meter height.

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CW	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the water level.
D1	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z1 height.
D2	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z2 height.
DB	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the 10 meter height.
DFBR	%	Difference between the profile and bulk derived bowen ratio values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFDRAG	%	Difference between the profile and bulk derived drag coefficient values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFFRIC	%	Difference between the profile and bulk derived friction velocity values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty , whichever absolute value is larger).
DFHEFX	%	Difference between the profile and bulk derived sensisble heat flux values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFLHFX	%	Difference between the profile and bulk derived latent heat flux values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFMOFX	%	Difference between the profile and bulk derived momentum flux values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFRI	%	Difference between the profile and bulk derived gradient Richardson number stability values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFRUFL	%	Difference between the profile and bulk derived roughness length values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFSLPT	%	Difference between the profile and bulk derived scaling potential temperature values as computed by the standard deviation from the composite weighted mean (or measurement uncertainty value, whichever absolute value is larger).

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DFSLSH	%	Difference between the profile and bulk derived scaling specific humidity values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFSR	%	Difference between the profile and bulk derived sky and solar radiation heat flux values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFTHFX	%	Difference between the profile and bulk derived total heat budget flux values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DFZOLT	%	Difference between the profile and bulk derived Z/L (or $\zeta$ ) stability parameter at 10 meters values as computed by the standard deviation from the composite error weighted mean (or measurement uncertainty value, whichever absolute value is larger).
DH	watt/m <sup>2</sup>	Sum of the absolute values of the profile derived solar radiation, latent, and sensible heat fluxes.
DHB	watt/m <sup>2</sup>	Sum of the absolute values of the bulk derived solar radiation, latent, and sensible heat fluxes.
DHEFLX	watt/m <sup>2</sup>	Incremental change in profile derived heat flux equivalent to the calculated error $\times 100$ .
DHEFXB	watt/m <sup>2</sup>	Incremental change in bulk aerodynamic derived heat flux equivalent to the calculated error $\times 100$ .
DLHFLX	watt/m <sup>2</sup>	Incremental change in profile derived latent heat flux equivalent to the calculated error $\times 100$ .
DLHFXB	watt/m <sup>2</sup>	Incremental change in bulk aerodynamic derived latent heat flux equivalent to the calculated error $\times 100$ .
DP1	°C	Dew point in °C at the Z1 height.
DP1FCAL	volt	Dew point field calibration correction at the Z1 height.
DP2	°C	Dew point in °C at the Z2 height.
DP2FCAL	volt	Dew point field calibration correction at the Z2 height.
DPB	°C	Dew point in °C at 10 meter height.
DPK1	°K	Dew point in °K at the Z1 height.
DPK2	°K	Dew point in °K at the Z2 height.
DPKB	°K	Dew point in °K at the 10 meter height.

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DPTDZ	°K/m	Profile derived partial derivative of potential temperature with respect to height.
DRAG	—	Profile derived neutral atmospheric drag coefficient computed for the 10 meter height.
DRAGB	—	Bulk aerodynamic derived neutral atmospheric drag coefficient computed for the 10 meter height.
DSHDZ	kg/kg · m	Profile derived partial derivative of specific humidity with respect to height.
DSR	watt/m <sup>2</sup>	Incremental change in the sky and solar radiation heat flux equivalent to the measurement error × 100.
DSRB	watt/m <sup>2</sup>	Same as DSR.
DW	—	Intermediate step in Goff-Gratch formulation of vapor pressure at water level.
DWSDZ	m/sec · m	Profile derived partial derivative of wind speed with respect to height.
EAHWB	%	Mean error referenced to the measurement accuracy for the computed absolute humidity difference between the 10 meter height and water level.
EBR	%	Mean error referenced to the measurement accuracy for the profile derived Bowen Ratio.
EBRB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived Bowen Ratio.
EDRAG	%	Mean error referenced to the measurement accuracy for the profile derived drag coefficient at the 10 meter height.
EDRAGB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived drag coefficient at the 10 meter height.
EFRICB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived friction (or scaling) velocity.
EFRICV	%	Mean error referenced to the measurement accuracy for the profile derived friction (or scaling) velocity.
EHEFLX	%	Mean error referenced to the measurement accuracy for the profile derived sensible heat flux.
EHEFXB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived sensible heat flux.
EHUFLX	%	Mean error referenced to the measurement accuracy for the profile derived humidity flux.

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EHUFXB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived humidity flux.
ELHFLX	%	Mean error referenced to the measurement accuracy for the profile derived latent heat flux.
ELHFXB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived latent heat flux.
EMOFLX	%	Mean error referenced to the measurement accuracy for the profile derived momentum flux.
EMOFXB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived momentum flux.
EMOLB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived Monin-Obukhov (or Obukhov) length.
EMTC	%	Mean error estimated for the bulk aerodynamic moisture transfer coefficient.
EPSID	%	Combined mean error associated with the parameter profile slopes due to the $[Ln(Z1)-PSI1Z1]-[Ln(Z2)-PSI1Z2]$ or $[Ln(Z1)-PSI2Z1]-[Ln(Z2)-PSI2Z2]$ terms.
EPTD	%	Mean error referenced to the measurement accuracy for the profile potential temperature differential.
EPTPD	%	Mean error reference to the measurement accuracy for the partial derivative of potential temperature with respect to height.
EPTSLP	%	Mean error referenced to the measurement accuracy for the profile slope of the potential temperature.
EPTWTB	%	Mean error referenced to the measurement accuracy for the difference between the potential temperature at 10 meters and the bulk water temperature.
ERI	%	Mean error referenced to the measurement accuracy for the profile derived gradient Richardson number stability.
ERIB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived gradient Richardson number stability.
ERUFL	%	Mean error referenced to the measurement accuracy for the profile derived roughness length.
ERUFLB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived roughness length.
ESCLPT	%	Mean error referenced to the measurement accuracy for the profile derived scaling potential temperature.

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ESCLSH	%	Mean error referenced to the measurement accuracy for the profile derived scaling specific humidity.
ESHD	%	Mean error referenced to the measurement accuracy for the profile specific humidity differential.
ESHPD	%	Mean error referenced to the measurement accuracy for the partial derivative of specific humidity with respect to height.
ESHSLP	%	Mean error referenced to the measurement accuracy for the profile slope of the specific humidity.
ESHTC	%	Mean error estimated for the bulk aerodynamic sensible heat transfer coefficient.
ESLPTB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived scaling potential temperature.
ESLSHB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived scaling specific humidity.
ESR	%	Mean error referenced to the measurement accuracy for sky and solar radiation heat flux.
ESRB	%	Same as ESR.
ESTRES	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived shearing (or surface) stress.
ETHFLX	%	Mean error referenced to the measurement accuracy for the profile derived total heat budget (or net heat) flux.
ETHFXB	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived total heat budget (or net heat) flux.
EVVHC	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived vertical velocity and absolute humidity covariance.
EVVLC	%	Mean error referenced to the measurement accuracy for the bulk aerodynamic derived vertical velocity and longitudinal velocity covariance.
EVVPTC	%	Mean error reference to the measurement accuracy for the bulk aerodynamic derived vertical velocity and potential temperature covariance.
EWSB	%	Mean error referenced to the measurement accuracy for the wind speed at the 10 meter height.
EWSD	%	Mean error referenced to the measurement accuracy for the profile wind speed differential.
EWSPD	%	Mean error referenced to the measurement accuracy for the partial derivative of the wind speed with respect to height.

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EWSSLP	%	Mean error referenced to the measurement accuracy for the profile slope of the wind speed.
$\exp()$	—	Exponent to base of natural logarithm $e$ of ( ), $e = 2.71828....$
EZB	%	Mean error referenced to the measurement accuracy of height at ten meters.
EZOL	%	Mean error referenced to the measurement accuracy of the profile derived $Z/L$ (or $\zeta$ ) stability parameter as computed at the geometric mean height (GMH).
EZOLB	%	Mean error referenced to the measurement accuracy of the bulk aerodynamic derived $Z/L$ (or $\zeta$ ) stability parameter as computed at the geometric mean height (GMH).
EZOLT	%	Mean error referenced to the measurement accuracy for the profile derived $Z/L$ (or $\zeta$ ) stability parameter as computed for the ten meter height.
EZOLTB	%	Mean error referenced to the measurement accuracy of the bulk aerodynamic derived $Z/L$ (or $\zeta$ ) stability parameter as computed for the ten meter height.
F	—	Variable in Newton-Raphson method solution for profile derived $Z/L$ (or $\zeta$ ) stability parameter when Richardson's number $\leq 0$ .
F'	—	Variable in Newton-Raphson method solution for profile derived $Z/L$ (or $\zeta$ ) stability parameter when Richardson's number $\leq 0$ .
F1	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z1 height.
F2	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the Z2 height.
FB	—	Intermediate step in Goff-Gratch formulation of vapor pressure at the 10 meter height.
FRICV	m/sec	Profile derived friction (or scaling) velocity.
FRICVB	m/sec	Bulk aerodynamic derived friction (or scaling) velocity.
FW	—	Intermediate step in Goff-Gratch formulation of vapor pressure at water level.
G1	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z1 height.
G2	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z2 height.
GA	m/sec <sup>2</sup>	Gravitational acceleration constant; set equal to 9.7959 for the San Nicolas Island latitude.



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GB	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the 10 meter height.
GGC10	—	Goff-Gratch formulation constant: $-3.49149$ .
GGC11	—	Goff-Gratch formulation constant: $11.344$ .
GGC12	—	Goff-Gratch formulation constant: $5.02808$ .
GGC13	—	Goff-Gratch formulation constant: $-7.90298$ .
GGC14	—	Goff-Gratch formulation constant: $8.1328 \times 10^{-3}$ .
GGC15	—	Goff-Gratch formulation constant: $-1.3816 \times 10^{-7}$ .
GMH	meter	Geometric mean of heights Z1 and Z2. This is the equivalent to the mean measurement height as plotted on a $\ln$ (height) vs. linear graph.
HEFLX	watt/m <sup>2</sup>	Profile derived sensible heat flux.
HEFLXB	watt/m <sup>2</sup>	Bulk aerodynamic derived sensible heat flux.
HUFLX	kg/sec · m <sup>2</sup>	Profile derived specific humidity flux.
HUFLXB	kg/sec · m <sup>2</sup>	Bulk aerodynamic derived specific humidity flux.
IPRZ	—	Interpolated logarithmic profile ratio of heights Z1 and Z2 employed for computing parameter values at the height of ten meters (ZB).
IPRTUR	—	Interpolated logarithmic profile ratio of heights ZTUR1 and ZTUR2 employed for computing the turbulence parameters values of the height at ten meters (ZB).
J	—	Variable in Newton-Raphson method solution for profile derived Z/L (or $\zeta$ ) stability parameter when Richardson's number $\leq 0$ .
J1	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z1 height.
J2	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z2 height.
JB	—	Intermediate step in Goff-Gratch formulation of saturated vapor at the 10 meter height.
K1	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z1 height.
K2	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z2 height.

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KB	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the 10 meter height.
LAMBDA	meter	Wavelength employed for computing optical refractive index; set equal to $5.4 \times 10^{-6}$ .
LHFLX	watt/m <sup>2</sup>	Profile derived latent heat flux.
LHFLXB	watt/m <sup>2</sup>	Bulk aerodynamic derived latent heat flux.
LHV	ITcal/kg	Profile derived latent heat of water vaporation.
LHVB	ITcal/kg	Bulk aerodynamic derived latent heat of water vaporation.
Ln ( )	—	Natural logarithm of ( ) with base e = 2.71828 ....
LOGFV	—	Logarithm to the base 10 of the profile derived friction velocity.
LOGFVB	—	Logarithm to the base 10 of the bulk derived friction velocity.
M1	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z1 height.
M2	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z2 height.
MB	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the 10 meter height.
MOFLX	Nt/m <sup>2</sup>	Profile derived momentum flux.
MOFLXB	Nt/m <sup>2</sup>	Bulk aerodynamic derived momentum flux.
MOL	meter	Profile derived Monin-Obukhov (or Obukhov) length.
MOLB	meter	Bulk aerodynamic derived Monin-Obukhov (or Obukhov) length.
MTC	—	Bulk aerodynamic moisture transfer coefficient; set equal to $1.32 \times 10^{-3}$ .
N ( ) <sub>n</sub>	—	Digital channel number ( ) consisting of 10 parallel digital characters, n = 1, 2, . . . 10.
OPTIR1	°K/m <sup>-2/3</sup>	Optical refractive index parameter ( $C_n^2$ ) at the ZTUR1 height.
OPTIR2	°K/m <sup>-2/3</sup>	Optical refractive index parameter ( $C_n^2$ ) at the ZTUR2 height.
OPTIRT	°K/m <sup>-2/3</sup>	Optical refractive index parameter ( $C_n^2$ ) at the 10 meter height.
PSI1Z1	—	Businger wind speed profile stability correction ( $\Psi_1$ ) for the Ln (Z1) height.

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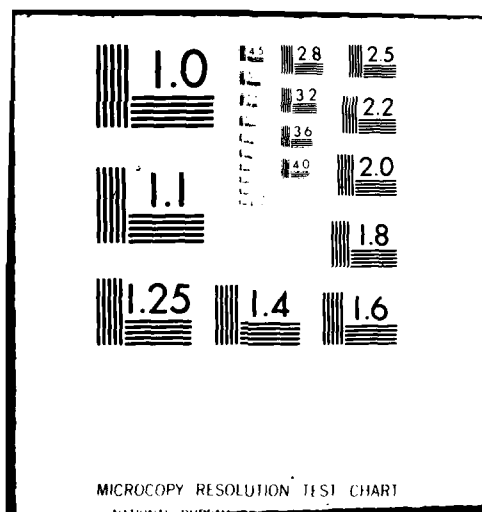
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PS11Z2	—	Businger wind speed profile stability correction ( $\Psi_1$ ) for the $L_n$ (Z2) height.
PS12Z1	—	Businger temperature and humidity stability correction ( $\Psi_2$ ) for the $L_n$ (Z1) height.
PS12Z2	—	Businger temperature and humidity stability correction ( $\Psi_2$ ) for the $L_n$ (Z2) height.
PT1	°C	Potential temperature in °C at the Z1 height.
PT2	°C	Potential temperature in °C at the Z2 height.
PTB	°C	Potential temperature in °C at the 10 meter height.
PTK1	°K	Potential temperature in °K at the Z1 height.
PTK2	°K	Potential temperature in °K at the Z2 height.
PTKB	°K	Potential temperature in °K at the 10 meter height.
PTKD	°K	Potential temperature vertical profile differential in °K.
PTKSLOP	—	Profile derived physical slope of $L_n$ (height) with Businger stability corrections vs. potential temperature.
PTWTB	°K	Potential temperature at the 10 meter height minus the bulk water temperature.
Q1	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z1 height.
Q2	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the Z2 height.
QB	—	Intermediate step in Goff-Gratch formulation of saturated vapor pressure at the 10 meter height.
REHL	—	Ratio of the upwind escarpment height to length as computed from the horizontally integrated ( $\pm 10^\circ$ ) near-field topography (within 25 meters of sensors) and the mean wind direction.
RH1	%	Relative humidity at the Z1 height.
RH2	%	Relative humidity at the Z2 height.
RHB	%	Relative humidity at the 10 meter height.
RI	—	Profile derived gradient Richardson number stability.
RIB	—	Bulk aerodynamic flux derived gradient Richardson number stability.
RLC10	—	Roughness length equation constant: -2.501

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RLC11	—	Roughness length equation constant: +1.465
RLC12	—	Roughness length equation constant: -6.743
RLC13	—	Roughness length equation constant: -10.700
RLC14	—	Roughness length equation constant: -6.875
RUFL	meter	Profile derived roughness length.
RUFLB	meter	Bulk aerodynamic derived roughness length.
SCLPT	°K	Profile derived scaling potential temperature.
SCLPTB	°K	Bulk aerodynamic derived scaling potential temperature.
SCLSH	kg/kg	Profile derived scaling specific humidity.
SCLSHB	kg/kg	Bulk aerodynamic derived scaling specific humidity.
SDBR	—	Standard deviation of the profile and bulk derived bowen ratio values from the composite error weighted mean.
SDDRAG	—	Standard deviation of the profile and bulk derived drag coefficient values from the composite error weighted mean.
SDFRIC	m/sec	Standard deviation of the profile and bulk derived friction velocity values from the composite error weighted mean.
SDHEFX	watt/m <sup>2</sup>	Standard deviation of the profile and bulk derived sensible heat flux values from the composite error weighted mean.
SDLHFX	watt/m <sup>2</sup>	Standard deviation of the profile and bulk derived latent heat flux values from the composite error weighted mean.
*SDMOFX	Nt/m <sup>2</sup>	Standard deviation of the profile and bulk derived momentum flux values from the composite error weighted mean.
SDRI	—	Standard deviation of the profile and bulk derived gradient Richardson number stability values from the composite error weighted mean.
SDRUFL	meter	Standard deviation of the profile and bulk derived roughness length values from the composite error weighted mean.
SDSLPT	°K	Standard deviation of the profile and bulk derived scaling potential temperature values from the composite error weighted mean.
SDSLSH	kg/kg	Standard deviation of the profile and bulk derived scaling specific humidity values from the composite error weighted mean.
SDSR	watt/m <sup>2</sup>	Standard deviation of the profile and bulk derived sky and solar radiation heat flux values from the composite error weighted mean.

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SDTHFX	watt/m <sup>2</sup>	Standard deviation of the profile and bulk derived total heat budget flux values from the composite error weighted mean.
SDZOLT	—	Standard deviation of the profile and bulk derived Z/L (or $\zeta$ ) stability parameter at 10 meters values from the composite error weighted mean.
SH1	kg/kg	Specific humidity at the Z1 height.
SH2	kg/kg	Specific humidity at the Z2 height.
SHB	kg/kg	Specific humidity at the 10 meter height.
SHD	kg/kg	Specific humidity vertical profile differential.
SHSLOP	—	Profile derived physical slope of $Ln$ (height) with Businger stability corrections vs. specific humidity.
SHTC	—	Bulk aerodynamic sensible heat transfer coefficient; set equal to $0.92 \times 10^{-3}$ .
SPHEAT	ITcal/kg °K	Profile derived specific heat of moist at constant pressure.
SPHEATB	ITcal/kg °K	Bulk aerodynamic derived specific heat of moist air at constant pressure.
SR	watt/m <sup>2</sup>	Sky and solar short wave radiation heat flux.
SSTRES	kg/m · sec <sup>2</sup>	Bulk aerodynamic derived shearing (or surface) stress.
SVP1	mb	Saturated water vapor pressure at the Z1 height.
SVP2	mb	Saturated water vapor pressure at the Z2 height.
SVPB	mb	Saturated water vapor pressure at the 10 meter height.
THFLX	watt/m <sup>2</sup>	Profile derived total heat budget (sky & solar short wave radiation + sensible heat + latent heat) flux.
THFLXB	watt/m <sup>2</sup>	Bulk aerodynamic derived total heat budget (sky & solar short wave radiation + sensible heat + latent heat) flux.
TRT	—	Intermediate step in computing the microthermal turbulence temperature structure parameter ( $C_t^2$ ) at the 10 meter height from profile $C_t^2$ measurements.
TTABLE	meter	Tide table referenced to mean sea level.
TUR1	°K/m <sup>-2/3</sup>	Microthermal turbulence temperature structure parameter ( $C_t^2$ ) at the ZTUR1 height.
TUR2	°K/m <sup>-2/3</sup>	Microthermal turbulence temperature structure parameter ( $C_t^2$ ) at the ZTUR2 height.
TURD	°K/m <sup>-2/3</sup>	Microthermal turbulence temperature structure vertical profile differential.

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TURSLOP	—	Profile derived slope of $Ln$ (height) vs. $Ln$ (microthermal turbulence temperature structure parameter ( $C_i^2$ )).
TURT	$^{\circ}K/m^{-2/3}$	Microthermal turbulence temperature structure parameter ( $C_i^2$ ) at the 10 meters height.
UWPL	meter	Upwind path length from the water's edge to the sensors as approximated from mean wind direction, and tide table data.
V( )	volt	Average raw data voltage for analog channel number ( ).
V' ( )	volt	Field calibration corrected average data voltage for analog channel number ( ).
VKC	—	Von Kármán constant; set equal to 0.4.
VP1	mb	Water vapor pressure at the Z1 height.
VP2	mb	Water vapor pressure at the Z2 height.
VPB	mb	Vapor pressure at the 10 meter height.
VPT1	$^{\circ}C$	Virtual potential temperature in $^{\circ}C$ at the Z1 height.
VPT2	$^{\circ}C$	Virtual potential temperature in $^{\circ}C$ at the Z2 height.
VPTB	$^{\circ}C$	Virtual potential temperature in $^{\circ}C$ at the 10 meter height.
VPTK1	$^{\circ}K$	Virtual potential temperature in $^{\circ}K$ at the Z1 height.
VPTK2	$^{\circ}K$	Virtual potential temperature in $^{\circ}K$ at the Z2 height.
VPTKB	$^{\circ}K$	Virtual potential temperature in $^{\circ}K$ at the 10 meter height.
VPTKM	$^{\circ}K$	Virtual potential temperature at the geometric mean height (GMH).
VPTWTB	$^{\circ}K$	Virtual potential temperature at the 10 meters height minus the bulk water temperature.
VPW	mb	Water vapor pressure estimated at water level by assuming the dew point temperature is equal to the water temperature.
VT1	$^{\circ}C$	Virtual temperature in $^{\circ}C$ at the Z1 height.
VT2	$^{\circ}C$	Virtual temperature in $^{\circ}C$ at the Z2 height.
VTB	$^{\circ}C$	Virtual temperature in $^{\circ}C$ at the 10 meter height.
VTK1	$^{\circ}K$	Virtual temperature in $^{\circ}K$ at the Z1 height.
VTK2	$^{\circ}K$	Virtual temperature in $^{\circ}K$ at the Z2 height.
VTKB	$^{\circ}K$	Virtual temperature in $^{\circ}K$ at the 10 meter height.



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VTKM	°K	Virtual temperature at the geometric mean height (GMH).
VTWTB	°K	Virtual temperature at the 10 meter height minus the bulk water temperature.
VVHC	$\text{m} \cdot \text{kg/sec} \cdot \text{m}^3$	Bulk aerodynamic derived vertical velocity and absolute humidity covariance.
VVLC	$\text{m}^2/\text{sec}^2$	Bulk aerodynamic derived vertical velocity and longitudinal velocity covariance.
VVPTC	$\text{m} \cdot \text{°K/sec}$	Bulk aerodynamic derived vertical velocity and potential temperature covariance.
WD	degree	Wind direction referenced to true North.
WMBR	—	Composite weighted mean for the profile and bulk derived bowen ratio values inversely weighted as a function of the respective measurement error.
WMDRAG	—	Composite weighted mean for the profile and bulk derived drag coefficient values inversely weighted as a function of the respective measurement error.
WMFRIC	$\text{m/sec}$	Composite weighted mean for the profile and bulk derived friction velocity values inversely weighted as a function of the respective measurement error.
WMHEFX	$\text{watt/m}^2$	Composite weighted mean for the profile and bulk derived sensible heat flux values inversely weighted as a function of the respective measurement error.
WMHUFX	$\text{kg/sec} \cdot \text{m}^2$	Composite weighted mean for the profile and bulk derived humidity flux values inversely weighted as a function of the respective measurement error.
WMLHFX	$\text{watt/m}^2$	Composite weighted mean for the profile and bulk derived latent heat flux values inversely weighted as a function of the respective measurement error.
WMMOFX	$\text{Nt/m}^2$	Composite weighted mean for the profile and bulk derived momentum flux values inversely weighted as a function of the respective measurement error.
WMMOL	meter	Composite weighted mean for the profile and bulk derived monin-obukhov length values inversely weighted as a function of the respective measurement error.
WMRI	—	Composite weighted mean for the profile and bulk derived gradient Richardson number stability values inversely weighted as a function of the respective measurement error.

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WMRUFL	meter	Composite weighted mean for the profile and bulk derived roughness length values inversely weighted as a function of the respective measurement error.
WMSLPT	°K	Composite weighted mean for the profile and bulk derived scaling potential temperature values inversely weighted as a function of the respective measurement error.
WMSLSH	kg/kg	Composite weighted mean for the profile and bulk derived scaling specific humidity values inversely weighted as a function of the respective measurement error.
WMSR	watt/m <sup>2</sup>	Composite weighted mean for the profile and bulk derived sky and solar radiation heat flux inversely weighted as a function of the respective measurement error.
WMTHFX	watt/m <sup>2</sup>	Composite weighted mean for the profile and bulk derived total heat budget flux values inversely weighted as a function of the respective measurement error.
WMZOL	—	Composite weighted mean for the profile and bulk derived Z/L (or $\zeta$ ) stability parameter at the geometric mean height values inversely weighted as a function of the respective measurement error.
WMZOLT	—	Composite weighted mean for the profile and bulk derived Z/L (or $\zeta$ ) stability parameter at 10 meters values inversely weighted as a function of the respective measurement error.
WS1	m/sec	Wind speed at the Z1 height.
WS1EC	—	Wind speed escarpment correction coefficient for the Z1 height.
WS2	m/sec	Wind speed at the Z2 height.
WS2EC	—	Wind speed escarpment correction coefficient for the Z2 height.
WSB	m/sec	Wind speed at the 10 meter height.
WSD	m/sec	Wind speed vertical profile differential.
WSM	m/sec	Mean wind speed of the measurements at the Z1 and Z2 heights.
WSSLOP	—	Profile derived physical slope of $Ln$ (height) with Businger stability corrections vs. wind speed.
WTB	°C	Bulk water temperature in °C.
WTBFCAL	volt	Bulk water temperature field calibration correction.
WTKB	°K	Bulk water temperature in °K.
WVGC	Nt · m/kg °K	Water vapor gas constant; set equal to $4.6150 \times 10^2$ .

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W1	—	Intermediate step in computation of the Businger stability correction for wind speed profile when Richardson number $\leq 0$ at the Z1 height.
W2	—	Intermediate step in computation of the Businger stability correction for wind speed profile when Richardson number $\leq 0$ at the Z2 height.
Y1	—	Intermediate step in computation of Businger stability correction for temperature and humidity profiles when Richardson number $\leq 0$ at the Z1 height.
Y2	—	Intermediate step in computation of Businger stability correction for temperature and humidity profiles when Richardson number $\leq 0$ at the Z2 height.
Z1	meter	Upper level average measurement height of profile instruments (except $C_r^2$ ) referenced to ground surface.
Z2	meter	Lower level average measurement height of profile instruments (except $C_r^2$ ) referenced to ground surface.
ZB	meter	This is the standard height for the bulk aerodynamic calculations; set equal to 10 meters as referenced to ground surface.
Z1OL	—	Profile derived Z/L (or $\zeta$ ) stability parameter computed for the Z1 height.
Z2OL	—	Profile derived Z/L (or $\zeta$ ) stability parameter computed for the Z2 height.
ZOL	—	Profile derived Z/L (or $\zeta$ ) stability parameter computed for the geometric mean height which is the relevant height for the conversion of Richardson number to Z/L.
ZOLB	—	Bulk aerodynamic flux derived Z/L (or $\zeta$ ) stability parameters computed for the geometric mean height.
ZOLT	—	Profile derived Z/L (or $\zeta$ ) stability parameter computed for the 10 meter height.
ZOLTB	—	Bulk aerodynamic flux derived Z/L (or $\zeta$ ) stability parameter computed for the 10 meter height.
ZTUR1	meter	Upper level measurement height of microthermal turbulence temperature structure ( $C_r^2$ ) sensors referenced to the ground surface.
ZTUR2	meter	Lower level measurement height of microthermal turbulence temperature structure ( $C_r^2$ ) sensors referenced to the ground surface.

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**Computer Calculations:**

[May 1979 Data]

Presented below are the calculations performed to obtain the micrometeorological parameters. They are listed in a simple algebraic form and utilize a shorthand English notation developed for computer programming purposes. The calculations include the curve-fit equations for converting the raw average voltages into engineering units, the field calibration and wind speed escarpment corrections, the equations for computing the various profile and bulk aerodynamic derived stability and flux parameters, and the computations for the error analysis of various parameters. The MKS International System of units is employed throughout this work, with the exception of millibars (mb) for barometric and vapor pressures instead of newton/meter<sup>2</sup> or pascal, and International Steam Table calories (ITcal.) instead of joules. Both °K and °C are employed.

$$\begin{aligned}1 \text{ millibar} &= 10^2 \text{ newton/meter}^2 = 10^2 \text{ Pascal} \\1 \text{ ITcal.} &= 4.18684 \text{ joules}\end{aligned}$$

The symbol \* to the left of an equation indicates a modification or addition made since the previous experiment. Equations and symbols deleted since the previous experiment are listed at the end of this section.

$$AT1 = N(1)_5 N(1)_6 \cdot N(1)_7 N(1)_8 N(1)_9 N(1)_{10}$$

and

$N(1)_1$  Mode: 1 = Primary Sensor, 2 = Backup Sensor

$N(1)_2$  Resolution: 3 =  $N(1)_7 \cdot N(1)_8$ , 4 =  $N(1)_6 \cdot N(1)_7$

$N(1)_3$  Interface Number: 1 = 1, 2 = 2, 3 = 3, 4 = 4

$N(1)_4$  Polarity: 1 = +, 2 = -

$$AT2 = N(2)_5 N(2)_6 \cdot N(2)_7 N(2)_8 N(2)_9 N(2)_{10}$$

and

$N(2)_1$  Mode: 1 = Primary Sensor, 2 = Backup Sensor.

$N(2)_2$  Resolution: 3 =  $N(2)_7 \cdot N(2)_8$ , 4 =  $N(2)_6 \cdot N(2)_7$

$N(2)_3$  Interface Number: 1 = 1, 2 = 2, 3 = 3, 4 = 4

$N(2)_4$  Polarity: 1 = +, 2 = -

If  $V(09) < 6.324$  volt, then:

$$WD = 145 + 34 \times V(09)$$

If  $V(09) \geq 6.324$  volt, then:

$$WD = -215 + 34 \times V(09)$$

\* If  $-1 < WD < 10$ , then:  $WS1EC = .992$  and  $WS2EC = .951$

$$REHL = .186 \text{ and } UWPL = 17 + 24.2 (1.18 - TTABLE)$$

\* If  $10 \leq WD < 20$ , then:  $WS1EC = .993$  and  $WS2EC = .956$

$$REHL = .168 \text{ and } UWPL = 19 + 20.8 (1.18 - TTABLE)$$

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- \* If  $20 \leq WD < 30$ , then:  $WS1EC = .994$  and  $WS2EC = .960$   
 $REHL = .152$  and  $UWPL = 20 + 21.2 (1.18 - TTABLE)$
- \* If  $30 \leq WD < 40$ , then:  $WS1EC = .994$  and  $WS2EC = .965$   
 $REHL = .136$  and  $UWPL = 20 + 25.0 (1.18 - TTABLE)$
- \* If  $40 \leq WD < 230$ , then:  $WS1EC = 1.000$  and  $WS2EC = 1.000$   
 $REHL = \text{"NOT COMPUTED"}$  and  $UWPL = \text{"NOT COMPUTED"}$
- \* If  $230 \leq WD < 240$ , then:  $WS1EC = .998$  and  $WS2EC = .985$   
 $REHL = .087$  and  $UWPL = 30 + 16.1 (1.18 - TTABLE)$
- \* If  $240 \leq WD < 250$ , then:  $WS1EC = .998$  and  $WS2EC = .984$   
 $REHL = .089$  and  $UWPL = 30 + 14.8 (1.18 - TTABLE)$
- \* If  $250 \leq WD < 260$ , then:  $WS1EC = .998$  and  $WS2EC = .983$   
 $REHL = .090$  and  $UWPL = 32 + 13.6 (1.18 - TTABLE)$
- \* If  $260 \leq WD < 270$ , then:  $WS1EC = .998$  and  $WS2EC = .983$   
 $REHL = .090$  and  $UWPL = 36 + 10.6 (1.18 - TTABLE)$
- \* If  $270 \leq WD < 280$ , then:  $WS1EC = .997$  and  $WS2EC = .982$   
 $REHL = .092$  and  $UWPL = 39 + 8.9 (1.18 - TTABLE)$
- \* If  $280 \leq WD < 290$ , then:  $WS1EC = .997$  and  $WS2EC = .977$   
 $REHL = .103$  and  $UWPL = 38 + 14.4 (1.18 - TTABLE)$
- \* If  $290 \leq WD < 300$ , then:  $WS1EC = .995$  and  $WS2EC = .969$   
 $REHL = .125$  and  $UWPL = 41 + 29.7 (1.18 - TTABLE)$
- \* If  $300 \leq WD < 310$ , then:  $WS1EC = .993$  and  $WS2EC = .959$   
 $REHL = .157$  and  $UWPL = 34 + 65.3 (1.18 - TTABLE)$
- \* If  $310 \leq WD < 320$ , then:  $WS1EC = .992$  and  $WS2EC = .952$   
 $REHL = .183$  and  $UWPL = 27 + 69.9 (1.18 - TTABLE)$
- \* If  $320 \leq WD < 330$ , then:  $WS1EC = .992$  and  $WS2EC = .949$   
 $REHL = .199$  and  $UWPL = 21 + 48.7 (1.18 - TTABLE)$
- \* If  $330 \leq WD < 340$ , then:  $WS1EC = .991$  and  $WS2EC = .947$   
 $REHL = .206$  and  $UWPL = 19 + 36.9 (1.18 - TTABLE)$

\* If  $340 \leq WD < 350$ , then:  $WS1EC = .991$  and  $WS2EC = .947$

$$REHL = .207 \text{ and } UWPL = 16 + 29.7 (1.18 - TTABLE)$$

\* If  $350 \leq WD < 361$ , then:  $WS1EC = .992$  and  $WS2EC = .948$

$$REHL = .201 \text{ and } UWPL = 16 + 24.2 (1.18 - TTABLE)$$

\* If  $V(05) \leq 2.570$  volt, then:

$$WS1 = [-6.32834 \times 10^{-2} + 2.42269 \times V(05) - 0.399002 \times V(05)^2 + 8.72726 \times 10^{-2} \times V(05)^3] \times WS1EC$$

\* If  $V(05) > 2.570$  volt, then:

$$WS1 = [3.08914 \times 10^{-2} + 1.93793 \times V(05) - 6.72817 \times 10^{-4} \times V(05)^2] \times WS1EC$$

\* If  $V(06) \leq 2.558$  volt, then:

$$WS2 = [-7.13544 \times 10^{-2} + 2.52039 \times V(06) - 0.404911 \times V(06)^2 + 8.22668 \times 10^{-2} \times V(06)^3] \times WS2EC$$

\* If  $V(06) > 2.558$  volt, then:

$$WS2 = [0.181091 + 1.92438 \times V(06) + 1.55926 \times 10^{-4} \times V(06)^2] \times WS2EC$$

\*  $DP1FCAL =$  (as indicated on data printout)

\*  $DP2FCAL =$  (as indicated on data printout)

$$V'(03) = V(03) + DP1FCAL$$

$$DP1 = -20.825 + 6.25047 \times V'(03) - 4.04968 \times 10^{-2} \times V'(03)^2 + 1.43719 \times 10^{-3} \times V'(03)^3$$

$$V'(04) = V(04) + DP2FCAL$$

$$DP2 = -20.5158 + 6.06103 \times V'(04) - 2.15130 \times 10^{-2} \times V'(04)^2 + 1.890459 \times 10^{-3} \times V'(04)^3$$

If  $|V(01)| > 1.0$  volt, then:

$$TUR1 = \left[ 1.07722 \times 10^{\left( 1 - \frac{|V(01)|}{2} \right)} \right]^2$$

If  $|V(01)| \leq 1.0$  volt, then:

$$TUR1 = \text{"NO DATA"}$$

If  $|V(02)| > 1.0$  volt, then:

$$TUR2 = \left[ 1.07722 \times 10^{\left( 1 - \frac{|V(02)|}{2} \right)} \right]^2$$

If  $|V(02)| \leq 1.0$  volt, then:

$$TUR2 = \text{"NO DATA"}$$

$$*BP2 = 941.51 + 14.123 V(07) + 0.22644 \times V(07)^2 - 1.41907 \times 10^{-2} \times V(07)^3$$

$$*SR = -139.46 \times V(08)$$

\*  $WTBFCAL =$  (as indicated on data printout)

$$*V'(10) = V(10) + WTBFCAL$$

$$*WTB = 9.75329 + 0.969791 \times V'(10) + 6.10709 \times 10^{-4} \times V'(10)^2$$

$$*Z1 = 18.35$$

$$* Z2 = 9.20$$

$$ZB = 10.000$$

$$ZTUR1 = Z1 + 0.60$$

$$ZTUR2 = Z2 + 0.60$$

$$GMH = \sqrt{Z1 \times Z2}$$

$$* BP1 = BP2 - [(Z1 - Z2) \times 0.12]$$

$$* BPB = BP1 + [(Z1 - ZB) \times 0.12]$$

$$* BPM = BP1 + [(Z1 - GMH) \times 0.12]$$

$$* BPW = BP1 + [(Z1) \times 0.12]$$

$$ATK1 = AT1 + 273.160$$

$$ATK2 = AT2 + 273.160$$

$$DPK1 = DP1 + 273.160$$

$$DPK2 = DP2 + 273.160$$

$$A1 = 373.160 / DPK1$$

$$A2 = 373.160 / DPK2$$

$$B1 = A1 - 1.000$$

$$B2 = A2 - 1.000$$

$$C1 = 1.000 - \left( \frac{1}{A1} \right)$$

$$C2 = 1.000 - \left( \frac{1}{A2} \right)$$

$$GGC10 = -3.49149$$

$$GGC11 = 11.344$$

$$GGC12 = 5.02808$$

$$GGC13 = -7.90298$$

$$GGC14 = 8.1328 \times 10^{-3}$$

$$GGC15 = -1.3816 \times 10^{-7}$$

$$D1 = [10^{(GGC10) \times (B1)}] - 1.000$$

$$D2 = [10^{(GGC10) \times (B2)}] - 1.000$$

$$* F1 = [10^{(GGC11) \times (C1)}] - 1.000$$

$$* F2 = [10^{(GGC11) \times (C2)}] - 1.000$$

$$VP1 = BP1 \times (A1)^{GGC12} \times 10^{[GGC13 \times B1] + [GGC14 \times D1] + [GGC15 \times F1]}$$

$$VP2 = BP2 \times (A2)^{GGC12} \times 10^{[GGC13 \times B2] + [GGC14 \times D2] + [GGC15 \times F2]}$$

$$G1 = 373.160 / ATK1$$

$$G2 = 373.160 / ATK2$$

$$Q1 = G1 - 1.000$$

$$Q2 = G2 - 1.000$$

$$J1 = 1.000 - \left[ \frac{1}{G1} \right]$$

$$J2 = 1.000 - \left[ \frac{1}{G2} \right]$$

$$K1 = [10^{(GGC10) \times (Q1)}] - 1.000$$

$$K2 = [10^{(GGC10) \times (Q2)}] - 1.000$$

$$M1 = [10^{(GGC11) \times (J1)}] - 1.000$$

$$M2 = [10^{(GGC11) \times (J2)}] - 1.000$$

$$* SVP1 = BP1 \times (G1)^{GGC12} \times 10^{[GGC13 \times Q1] + [GGC14 \times K1] + [GGC15 \times M1]}$$

$$* SVP2 = BP2 \times (G2)^{GGC12} \times 10^{[GGC13 \times Q2] + [GGC14 \times K2] + [GGC15 \times M2]}$$

$$WVGC = 4.6150 \times 10^2$$

$$AH1 = (VP1) \times \left[ \frac{100}{(WVGC)(ATK1)} \right]$$

$$AH2 = (VP2) \times \left[ \frac{100}{(WVGC)(ATK2)} \right]$$

$$RH1 = \left[ \frac{VP1}{SVP1} \right] \times 100$$

$$RH2 = \left[ \frac{VP2}{SVP2} \right] \times 100$$

$$* SH1 = \frac{0.622 \times VP1}{BP1 - (0.378 \times VP1)}$$

$$* SH2 = \frac{0.622 \times VP2}{BP2 - (0.378 \times VP2)}$$

$$VTK1 = (ATK1) \times [1.000 + (SH1 \times 0.608)]$$

$$VTK2 = (ATK2) \times [1.000 + (SH2 \times 0.608)]$$

$$VT1 = VTK1 - 273.160$$

$$VT2 = VTK2 - 273.160$$

$$PTK1 = (ATK1) + (0.0098 \times Z1)$$

$$PTK2 = (ATK2) + (0.0098 \times Z2)$$

$$PT1 = PTK1 - 273.160$$

$$PT2 = PTK2 - 273.160$$

$$VPTK1 = (VTK1) + (0.0098 \times Z1)$$

$$VPTK2 = (VTK2) + (0.0098 \times Z2)$$

$$VPT1 = VPTK1 - 273.160$$



$$VPT2 = VPTK2 - 273.160$$

$$WSM = \frac{WS1 + WS2}{2}$$

$$* WSD = (WS1 - WS2)$$

If  $|WSD| < (WSM \times .028)$ , then set:

$$WSD = +(WSM \times .028)$$

$$SHD = (SH1 - SH2)$$

\* If  $|SHD| < .08 \times 10^{-3}$  and  $DP2 > WTB$ , then set:

$$SHD = +.08 \times 10^{-3}$$

\* If  $|SHD| < .08 \times 10^{-3}$  and  $DP2 \leq WTB$ , then set:

$$SHD = -.08 \times 10^{-3}$$

$$* PTKD = (PTK1 - PTK2)$$

\* If  $|PTKD| < .008$  and  $PT2 \geq WTB$ , then set:

$$PTKD = +.008$$

\* If  $|PTKD| < .008$  and  $PT2 < WTB$ , then set:

$$PTKD = -.008$$

$$* DWSDZ = \frac{WSD}{GMH \times \ln(Z1/Z2)}$$

$$* DSHDZ = \frac{SHD}{GMH \times \ln(Z1/Z2)}$$

$$* DPTDZ = \frac{PTKD}{GMH \times \ln(Z1/Z2)}$$

$$ATKM = \frac{ATK1 + ATK2}{2}$$

$$VPTKM = \frac{VPTK1 + VPTK2}{2}$$

$$GA = 9.7959$$

$$RI = \frac{(GA) \times (DPTDZ)}{(VPTKM) \times [DWSDZ]^2}$$

If  $RI < -2.0$ , then  $ZOL = \text{"NOT COMPUTED"}$

If  $-2.0 \leq RI \leq 0$ , then compute  $ZOL$  as a function of  $RI$  solving the below equation in reverse via the Newton-Raphson Method for:

$$RI = [0.74(ZOL)] \times \frac{[1 - 15(ZOL)]^{1/2}}{[1 - 9(ZOL)]^{1/2}}$$

Let  $J = RI$  as an arbitrary starting point and

$$ZOL^{J+1} = ZOL^J - \frac{F(ZOL^J)}{F'(ZOL^J)}$$

Where:

$ZOL^J$  is the current guess.

$ZOL^{J+1}$  is the next iteration.

and

$$F(ZOL) = \frac{.74(ZOL)[1 - 15(ZOL)]^{1/2}}{[1 - 9(ZOL)]^{1/2}} - RI$$

$$F'(ZOL) = \left[ (.74)[1 - 15(ZOL)]^{1/2} \right] - \left[ \frac{11.1(ZOL)}{[2 - 30(ZOL)]^{1/2}} \right] + \left[ \frac{9(RI)}{[2 - 18(ZOL)]^{1/2}} \right]$$

Execute the iterations until:

$$\frac{|ZOL^{J+1} - ZOL^J|}{|ZOL^{J+1}|} < .0005$$

At which point an exceptable value for ZOL has been computed.

Then:

$$MOL = \frac{GMH}{ZOL}$$

$$Z1OL = \frac{Z1}{MOL}$$

$$Z2OL = \frac{Z2}{MOL}$$

$$W1 = [1 - 15(Z1OL)]^{1/4}$$

$$W2 = [1 - 15(Z2OL)]^{1/4}$$

$$Y1 = [1 - 9(Z1OL)]^{1/2}$$

$$Y2 = [1 - 9(Z2OL)]^{1/2}$$

With *arctan* expressed in radians:

$$PSI1Z1 = 2 \times \ln \left( \frac{1 + W1}{2} \right) + \ln \left( \frac{1 + (W1)^2}{2} \right) - [2 \arctan(W1)] + \frac{\pi}{2}$$

$$PSI1Z2 = 2 \times \ln \left( \frac{1 + W2}{2} \right) + \ln \left( \frac{1 + (W2)^2}{2} \right) - [2 \arctan(W2)] + \frac{\pi}{2}$$

$$PSI2Z1 = \ln \left( \frac{1 + Y1}{2} \right)$$

$$PSI2Z2 = \ln \left( \frac{1 + Y2}{2} \right)$$

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If  $RI > +0.2$ , then  $ZOL = \text{"NOT COMPUTED"}$

If  $+0.2 \geq RI > 0$ , then compute  $ZOL$  as a function of  $RI$  solving the below equation in reverse via the Quadratic Solution for:

$$RI = \frac{0.74(ZOL) + 4.7(ZOL)^2}{[1 + 4.7(ZOL)]^2}$$

Let:

$$ZOL = \frac{-B - \sqrt{B^2 - 4(A \times C)}}{2(A)}$$

Where:

$$A = (22.09 \times RI) - 4.7$$

$$B = (9.4 \times RI) - 0.74$$

$$C = RI$$

Then:

$$MOL = \frac{GMH}{ZOL}$$

$$Z1OL = \frac{Z1}{MOL}$$

$$Z2OL = \frac{Z2}{MOL}$$

$$PSI1Z1 = -4.7(Z1OL)$$

$$PSI1Z2 = -4.7(Z2OL)$$

$$PSI2Z1 = \frac{-4.7(Z1OL)}{0.74}$$

$$PSI2Z2 = \frac{-4.7(Z2OL)}{0.74}$$

$$ZOLT = \frac{ZB}{MOL}$$

$$*VKC = 0.4$$

$$*WSSLOP = \frac{[Ln(Z1) - PSI1Z1] - [Ln(Z2) - PSI1Z2]}{WSD}$$

$$*SHSLOP = \frac{[Ln(Z1) - PSI2Z1] - [Ln(Z2) - PSI2Z2]}{SHD}$$

$$*PTKSLOP = \frac{[Ln(Z1) - PSI2Z1] - [Ln(Z2) - PSI2Z2]}{PTKD}$$

$$*TURD = (TUR1 - TUR2)$$

$$*If |TURD| < .05, then set [Ln(TUR1) - Ln(TUR2)] = -3.0$$

$$*TURSLOP = \frac{[Ln(ZTUR1) - Ln(ZTUR2)]}{[Ln(TUR1) - Ln(TUR2)]}$$

$$FRICV = \frac{VKC}{WSSLOP}$$

$$*RLC10 = -2.501$$

$$*RLC11 = +1.465$$

$$*RLC12 = -6.743$$

$$*RLC13 = -10.700$$

$$*RLC14 = -6.875$$

$$*LOGFV = \text{Log}_{10}(FRICV)$$

$$*RUFL = 10^{RLC10 + RLC11(LOGFV) + RLC12(LOGFV)^2 + RLC13(LOGFV)^3 + RLC14(LOGFV)^4}$$

$$SCLSH = \frac{VKC}{0.74(SHSLOP)}$$

$$SCLPT = \frac{VKC}{0.74(PTKSLOP)}$$

$$VTKM = \frac{VTK1 + VTK2}{2}$$

$$*AIRD = \frac{.34838(BPM)}{VTKM}$$

$$SPHEAT = 0.240 \left[ 1 + 0.90 \left( \frac{SH1 + SH2}{2} \right) \right] \times 10^3$$

$$MOFLX = -(AIRD) \times (FRICV)^2$$

$$HUFLX = -(AIRD) \times (FRICV) \times (SCLSH)$$

$$HEFLX = -(AIRD) \times (FRICV) \times (SCLPT) \times [(SPHEAT) \times 4.18684]$$

$$ATM = ATKM - 273.160$$

$$LHV = \{597.31 - [.56525(ATM)]\} \times 10^3$$

$$*LHFLX = (HUFLX) \times [(LHV) \times (4.18684)]$$

$$*THFLX = HEFLX + LHFLX + SR$$

$$*BR = \frac{HEFLX}{LHFLX}$$

$$LAMBDA = 5.4 \times 10^{-6}$$

$$*OPTIR1 = \left[ \frac{77.6(BP1)}{(ATK1)^2} \right]^2 \times \left[ 1 + \frac{7.53 \times 10^9}{(LAMBDA)^2} \right]^2 \times (TUR1) \times 10^{-12}$$

$$*OPTIR2 = \left[ \frac{77.6(BP2)}{(ATK2)^2} \right]^2 \times \left[ 1 + \frac{7.53 \times 10^9}{(LAMBDA)^2} \right]^2 \times (TUR2) \times 10^{-12}$$

$$*IPRZ = \frac{Ln(Z1) - Ln(ZB)}{Ln(Z1) - Ln(Z2)}$$

$$*IPRTUR = \frac{Ln(Z1) - Ln(ZB)}{Ln(ZTUR1) - Ln(ZTUR2)}$$

$$*WSB = WS1 - [IPRZ (WS1 - WS2)]$$

$$*DPKB = DPK1 - [IPRZ (DPK1 - DPK2)]$$

$$*ATKB = ATK1 - [IPRZ (ATK1 - ATK2)]$$

$$*TRT = \ln (TUR1) - \left[ IPRTUR \times \ln \left( \frac{TUR1}{TUR2} \right) \right]$$

$$TURT = \exp (TRT)$$

$$*DRAG = \left( \frac{FRICV}{WSB} \right)^2$$

$$DPB = DPKB - 273.160$$

$$ATB = ATKB - 273.160$$

$$AB = 373.160 / DPKB$$

$$BB = AB - 1.000$$

$$CB = 1.000 - \left( \frac{1}{AB} \right)$$

$$DB = [10^{(GGC10) \times (BB)}] - 1.000$$

$$FB = [10^{(GGC11) \times (CB)}] - 1.000$$

$$*VPB = BPB \times (AB)^{GGC12} \times 10^{[GGC13 \times BB] + [GGC14 \times DB] + [GGC15 \times FB]}$$

$$GB = 373.160 / ATKB$$

$$QB = GB - 1.000$$

$$JB = 1.000 - \left( \frac{1}{GB} \right)$$

$$KB = [10^{(GGC10) \times (QB)}] - 1.000$$

$$MB = [10^{(GGC11) \times (JB)}] - 1.000$$

$$*SVPB = BPB \times (GB)^{GGC12} \times 10^{[GGC13 \times QB] + [GGC14 \times KB] + [GGC15 \times MB]}$$

$$AHB = (VPB) \times \left[ \frac{100}{(WVGC) \times (ATKB)} \right]$$

$$RHB = \left[ \frac{VPB}{SVPB} \right] \times 100$$

$$*SHB = \frac{0.622 \times VPB}{BPB - (0.378 \times VPB)}$$

$$VTKB = (ATKB) \times [1.000 + (SHB \times 0.608)]$$

$$VTB = VTKB - 273.160$$

$$PTKB = (ATKB) + [0.0098 \times ZB]$$

$$PTB = PTKB - 273.160$$

$$VPTKB = (VTKB) + [0.0098 \times ZB]$$

$$VPTB = VPTKB - 273.160$$

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$$WTKB = WTB + 273.160$$

$$ATWTB = ATKB - WTKB$$

$$PTWTB = PTKB - WTKB$$

$$VTWTB = VTKB - WTKB$$

$$VPTWTB = VPTKB - WTKB$$

$$SHTC = 0.92 \times 10^{-3}$$

$$SPHEATB = (0.40[1 + 0.90 (SHB)]) \times 10^3$$

$$*AIRDB = \frac{.34838(BPB)}{VTKB}$$

$$VVPTC = 0.002 - [(SHTC) \times (WSB) \times (PTWTB)]$$

$$HEFLXB = (AIRDB) \times (VVPTC) \times [(SPHEATB) \times 4.18684]$$

$$AW = 373.160/WTKB$$

$$BW = AW - 1.000$$

$$CW = 1.000 - \left[ \frac{1}{AW} \right]$$

$$DW = [10^{(GGC10) \times (BW)}] - 1.000$$

$$FW = [10^{(GGC11) \times (CW)}] - 1.000$$

$$*VPW = BPW \times (AW)^{GGC12} \times 10^{[GGC13 \times BW] + [GGC14 \times DW] + [GGC15 \times FW]}$$

$$AHW = (VPW) \times \left[ \frac{100}{(WVGC) \times (WTKB)} \right]$$

$$MTC = 1.32 \times 10^{-3}$$

$$VVHC = (MTC) \times (WSB) \times [AHW - AHB]$$

$$HUFLXB = VVHC$$

$$LHVB = [597.31 - (.56525(ATB))] \times 10^3$$

$$*LHFLXB = (HUFLXB) \times [(LHVB) \times (4.18684)]$$

$$*THFLXB = HEFLXB + LHFLXB + SR$$

$$*BRB = \frac{HEFLXB}{LHFLXB}$$

$$DRAGB = [0.63 + [0.066(WSB)]] \times 10^{-3}$$

$$*SSTRES = (DRAGB) \times (WSB)^2 \times (AIRDB)$$

$$*VVLC = -SSTRES/AIRDB$$

$$*MOFLXB = -(SSTRES)$$

$$*FRICVB = \left[ \frac{(SSTRES)}{(AIRDB)} \right]^{1/2}$$

$$*LOGFVB = \text{Log}_{10}(FRICVB)$$

$$*RUFLB = 10^{RLC10 + RLC11(\text{LOGVB}) + RLC12(\text{LOGVB})^2 + RLC13(\text{LOGVB})^3 + RLC14(\text{LOGVB})^4}$$

$$SCLSHB = \frac{-HUFLXB}{(AIRDB) \times (FRICVB)}$$

$$SCLPTB = \frac{-HEFLXB}{(AIRDB) \times (FRICVB) \times [4.18684(SPHEATB)]}$$

$$MOLB = \frac{-(ATKB) \times [FRICVB]^3}{(GA) \times (VVPTC) \times (VKC)}$$

$$ZOLB = \frac{GMH}{MOLB}$$

If  $ZOLB \leq 0$ , then:

$$RIB = [0.74(ZOLB)] \times \frac{[1 - 15(ZOLB)]^{1/2}}{[1 - 9(ZOLB)]^{1/2}}$$

If  $ZOLB > 0$ , then:

$$RIB = \frac{(ZOLB) \times [0.74 + 4.7(ZOLB)]}{[1 + 4.7(ZOLB)]^2}$$

$$ZOLTB = \frac{ZB}{MOLB}$$

$$*OPTIRT = \left[ \frac{(77.6) \times (BPB)}{(ATKB)^2} \right]^2 \times \left[ 1 + \frac{7.53 \times 10^9}{(LAMBDA)^2} \right]^2 \times (TURT) \times 10^{-12}$$

$$*EWSD = \frac{.028(WSM)}{|WSD|} \times 100$$

$$*ESHD = \frac{.08 \times 10^{-3}}{|SHD|} \times 100$$

$$*EPTD = \frac{.008}{|PTKD|} \times 100$$

$$*EWSPD = EWSD$$

$$*ESHDPD = ESHD$$

$$*EPTPD = EPTD$$

$$*ERI = EPTPD + 2(EWSPD)$$

\*If  $RI \leq 0$ , then set :

$$EZOL = ERI$$

\*If  $RI > 0$ , then set:

$$EZOL = [1 + (10|RI|)] \times ERI$$

$$*EPSID = \left[ \frac{|ZOL| + .2}{4} \right] \times EZOL$$

$$*EZOLT = EZOL$$

$$*EWSSLP = EPSID + EWSD$$

$$*ESHSLP = EPSID + ESHD$$

$$*EPTSLP = EPSID + EPTD$$

$$*EFRICV = EWSSLP$$

$$*EDRAG = 2(EFRICV)$$

$$*ERUFL = EFRICV + 20$$

$$*ESCLSH = ESHSLP$$

$$*ESCLPT = EPTSLP$$

$$*EMOFLX = 2(EFRICV)$$

$$*EHUFLX = EFRICV + ESCLSH$$

$$*EHEFLX = EFRICV + ESCLPT$$

$$*ELHFLX = EHUFLX$$

$$*EBR = EHEFLX + ELHFLX$$

$$*ESR = \frac{(|SR| + 14) \times .05}{|SR|} \times 100$$

$$*DHEFLX = |(HEFLX)| \times (EHEFLX)$$

$$*DLHFLX = |(LHFLX)| \times (ELHFLX)$$

$$*DSR = |(SR)| \times (ESR)$$

$$*DH = |HEFLX| + |LHFLX| + |SR|$$

$$*ETHFLX = \left[ \left( \frac{DHEFLX}{DH} \right)^2 + \left( \frac{DLHFLX}{DH} \right)^2 + \left( \frac{DSR}{DH} \right)^2 \right]^{1/2}$$

$$*EZB = 3$$

$$*EWSB = 3$$

$$*ESHTC = 55$$

$$*EMTC = 25$$

$$*EDRAGB = 40$$

$$*EPTWTB = \frac{0.5}{|PTWTB|} \times 100$$

$$*EAHWB = \frac{0.4 \times 10^{-3}}{|AHW - AHB|} \times 100$$

$$*EVVPTC = ESHTC + EWSB + EPTWTB$$

$$*EHEFXB = EVVPTC$$

$$*EVVHC = EMTC + EWSB + EAHWB$$

$$*EHUFXB = EVVHC$$

$$*ELHFXB = EHUFXB$$

$$*EBRB = EHEFXB + ELHFXB$$

$$*ESRB = ESR$$

$$*DHEFXB = |(HEFLXB)| \times (EHEFXB)$$

$$*DLHFXB = |(LHFLXB)| \times (ELHFXB)$$

$$*DSRB = DSR$$

$$*DHB = |HEFLXB| + |LHFLXB| + |SR|$$

$$*ETHFXB = \left[ \left( \frac{DHEFXB}{DHB} \right)^2 + \left( \frac{DLHFXB}{DHB} \right)^2 + \left( \frac{DSRB}{DHB} \right)^2 \right]^{1/2}$$



$$* ESTRES = EDRAGB + 2(EWSB)$$

$$* EVVHC = ESTRES$$

$$* EMOFXB = ESTRES$$

$$* EFRICB = 0.5(ESTRES)$$

$$* ERUFLB = EFRICB + 20$$

$$* ESLSHB = EHUFXB + EFRICB$$

$$* ESLPTB = EHEFXB + EFRICB$$

$$* EMOLB = 3(EFRICB) + EVVPTC$$

$$* EZOLB = EMOLB + EZB$$

$$* EZOLTB = EZOLB$$

\* If  $ZOLB \leq 0$ , then set:

$$ERIB = EZOLB$$

\* If  $ZOLB > 0$ , then set:

$$ERIB = \frac{EZOLB}{1 + (10|RIB|)}$$

$$* WMRI = \left( \frac{RI}{ERI} + \frac{RIB}{ERIB} \right) / \left( \frac{1}{ERI} + \frac{1}{ERIB} \right)$$

$$* WMZOLT = \left( \frac{ZOLT}{EZOLT} + \frac{ZOLTB}{EZOLTB} \right) / \left( \frac{1}{EZOLT} + \frac{1}{EZOLTB} \right)$$

$$* WMMOFX = \left( \frac{MOFLX}{EMOFLX} + \frac{MOFLXB}{EMOFXB} \right) / \left( \frac{1}{EMOFLX} + \frac{1}{EMOFXB} \right)$$

$$* WMHUFX = \left( \frac{HUFLX}{ELMFLX} + \frac{HUFLXB}{ELHFXB} \right) / \left( \frac{1}{ELHFLX} + \frac{1}{ELMFXB} \right)$$

$$* WMLHFX = \left( \frac{LHFLX}{ELHFLX} + \frac{LHFLXB}{ELMFXB} \right) / \left( \frac{1}{ELHFLX} + \frac{1}{ELHFXB} \right)$$

$$* WMHEFX = \left( \frac{HEFLX}{EHEFLX} + \frac{HEFLXB}{EHEFXB} \right) / \left( \frac{1}{EHEFLX} + \frac{1}{EHEFXB} \right)$$

$$* WMSR = SR$$

$$* WMTHFX = \left( \frac{THFLX}{ETHFLX} + \frac{THFLXB}{ETHFXB} \right) / \left( \frac{1}{ETHFLX} + \frac{1}{ETHFXB} \right)$$

$$* WMBR = \left( \frac{BR}{EBR} + \frac{BRB}{EBRB} \right) / \left( \frac{1}{EBR} + \frac{1}{EBRB} \right)$$

$$* WMFRIC = \left( \frac{FRICV}{EFRICV} + \frac{FRICVB}{EFRICB} \right) / \left( \frac{1}{EFRICV} + \frac{1}{EFRICB} \right)$$

$$* WMSLSH = \left( \frac{SCLSH}{ESCLSH} + \frac{SCLSMB}{ESLSMB} \right) / \left( \frac{1}{ESCLSH} + \frac{1}{ESLSHB} \right)$$

$$* WMSLPT = \left[ \frac{SCLPT}{ESCLPT} + \frac{SCLPTB}{ESLPTB} \right] / \left[ \frac{1}{ESCLPT} + \frac{1}{ESLPTB} \right]$$

$$* WMRUFL = \left[ \frac{RUFL}{ERUFL} + \frac{RUFLB}{ERUFLB} \right] / \left[ \frac{1}{ERUFL} + \frac{1}{ERUFLB} \right]$$

$$* WMDRAG = \left[ \frac{DRAG}{EDRAG} + \frac{DRAGB}{EDRAGB} \right] / \left[ \frac{1}{EDRAG} + \frac{1}{EDRAGB} \right]$$

$$* SDRI = \left[ \frac{(RI - WMRI)^2 + (RIB - WMRI)^2}{2} \right]^{1/2}$$

$$* SDZOLT = \left[ \frac{(ZOLT - WMZOLT)^2 + (ZOLT B - WMZOLT)^2}{2} \right]^{1/2}$$

$$* SDMOFX = \left[ \frac{(MOFLX - WMMOFX)^2 + (MOFLXB - WMMOFX)^2}{2} \right]^{1/2}$$

$$* SDLHFX = \left[ \frac{(LHFLX - WMLHFX)^2 + (LHFLXB - WMLMFX)^2}{2} \right]^{1/2}$$

$$* SDHEFX = \left[ \frac{(HEFLX - WMHEFX)^2 + (HEFLXB - WMHEFX)^2}{2} \right]^{1/2}$$

$$* SDSR = 0$$

$$* SDTHFX = \left[ \frac{(THFLX - WMTHFX)^2 + (THFLXB - WMTMFX)^2}{2} \right]^{1/2}$$

$$* SDBR = \left[ \frac{(BR - WMBR)^2 + (BRB - WMBR)^2}{2} \right]^{1/2}$$

$$* SDFRIC = \left[ \frac{(FRICV - WMFRIC)^2 + (FRICVB - WMFRIC)^2}{2} \right]^{1/2}$$

$$* SDSLSH = \left[ \frac{(SCLSH - WMSLSH)^2 + (SCLSHB - WMSLSH)^2}{2} \right]^{1/2}$$

$$* SDSLPT = \left[ \frac{(SCLPT - WMSLPT)^2 + (SCLPTB - WMSLPT)^2}{2} \right]^{1/2}$$

$$* SDRUFL = \left[ \frac{(RUFL - WMRUFL)^2 + (RUFLB - WMRUFL)^2}{2} \right]^{1/2}$$

$$* SDDRAG = \left[ \frac{(DRAG - WMDRAG)^2 + (DRAGB - WMDRAG)^2}{2} \right]^{1/2}$$

$$* \text{If } |WMRI| > .02, \text{ then: } DFRI = \frac{SDRI}{|WMRI|} \times 100$$

$$* \text{If } |WMRI| \leq .02, \text{ then: } DFRI = \frac{SDRI}{.02} \times 100$$

$$* \text{If } |WMZOLT| > .02, \text{ then: } DFZOLT = \frac{SDZOLT}{|WMZOLT|} \times 100$$

$$* \text{If } |WMZOLT| \leq .02, \text{ then: } DFZOLT = \frac{SDZOLT}{.02} \times 100$$

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- \*If  $|WMMOFX| > .06$ , then:  $DFMOFX = \frac{SDMOFX}{|WMMOFX|} \times 100$
- \*If  $|WMMOFX| \leq .06$ , then:  $DFMOFX = \frac{SDMOFX}{.06} \times 100$
- \*If  $|WMLHFX| > 20$ , then:  $DFLMFX = \frac{SDLMFx}{|WMLHFX|} \times 100$
- \*If  $|WMLHFX| \leq 20$ , then:  $DFLHFX = \frac{SDLHFX}{20} \times 100$
- \*If  $|WMHEFX| > 3$ , then:  $DFHEFX = \frac{SDHEFX}{|WMHEFX|} \times 100$
- \*If  $|WMHEFX| \leq 3$ , then:  $DFHEFX = \frac{SDHEFX}{3} \times 100$
- \* $DFSR = 0$
- \*If  $|WMT HFX| > 30$ , then  $DFTMFx = \frac{SDTMFX}{|WMTMFx|} \times 100$
- \*If  $|WMT HFX| \leq 30$ , then  $DFTMFx = \frac{SDTHFX}{30} \times 100$
- \*If  $|WMBR| > .08$ , then  $DFBR = \frac{SDBR}{|WMBR|} \times 100$
- \*If  $|WMBR| \leq .08$ , then  $DFBR = \frac{SDBR}{.08} \times 100$
- \*If  $|WMFRIC| > 6 \times 10^{-2}$ , then  $DFFRIC = \frac{SDFRIC}{|WMFRIC|} \times 100$
- \*If  $|WMFRIC| \leq 6 \times 10^{-2}$ , then  $DFFRIC = \frac{SDFRIC}{6} \times 10^{-2} \times 100$
- \*If  $|WMSLSH| > 3 \times 10^{-5}$ , then  $DFSLSH = \frac{SDSLSH}{|WMSLSH|} \times 100$
- \*If  $|WMSLSM| \leq 3 \times 10^{-5}$ , then  $DFSLSH = \frac{SDSLSH}{3 \times 10^{-5}} \times 100$
- \*If  $|WMSLPT| > 2 \times 10^{-2}$ , then  $DFSLPT = \frac{SDSLPT}{|WMSLPT|} \times 100$
- \*If  $|WMSLPT| \leq 2 \times 10^{-2}$ , then  $DFSLPT = \frac{SDSLPT}{2 \times 10^{-2}} \times 100$
- \*If  $|WMRUFL| > 6 \times 10^{-5}$ , then  $DFRUFL = \frac{SDRUFL}{|WMRUFL|} \times 100$
- \*If  $|WMRUFL| \leq 6 \times 10^{-5}$ , then  $DFRUFL = \frac{SDRUFL}{|WMDRAG|} \times 100$
- \*If  $|WMDRAG| > 4 \times 10^{-4}$ , then  $DFDRAG = \frac{SDDRAG}{|WMDRAG|} \times 100$
- \*If  $|WMDRAG| \leq 4 \times 10^{-4}$ , then  $DFDRAG = \frac{SDDRAG}{4 \times 10^{-4}} \times 100$
- \*  $WMMOL = \frac{ZB}{WMZOLT}$
- \*  $WMZOL = \frac{GMH}{WMMOL}$

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Equations and symbols deleted since the previous experiment:

*BP*

*DVPTDZ*

*VPTKSLOP*

*SCLVPT*

*SCLVPTB*

*BOYFLX*

*BOYFLXB*

*RSTRES*

## 12. Bibliography

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13. Listing of Hewlett-Packard 9825A Computer Programs in HPL Language

Program Name	Page
SANNIC	601
CRUNCH	602
CRNCHO	602
CRNCH2	603-604
CRNCH3	604
SCRNCH	605
SANPRT	605
PRINT1	606
PRINT2	606
PRINT3	607
PRINT4	607
PRINT5	607
PRINT6	608
PRINT7	608
SPRNT1	609
SPRNT2	609
KPRINT	609
RECRNC	610
WTBCOR	610
TIDEAD	610
TIDPRT	611
MEAN	611
MAXMIN	612
DELETE	612
SANPLT	613-614
SANPL1	614-615
SANPL2	615-616
SANPL3	617-618
SANPL4	618-619
COPY	620
MEANL	620
SANLST	621
ESCPT	621
ESCPLT	622
WSAFP	623
WSALST	624
SANST	624
STVAR	625
TPLOT	625-626
TABLE	226
RUN #	226
SPCRNC	627



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20: "CRUNCH":
21: "Sub "CRUNCH" takes data from array A(I,J), puts it into engineering";
22: "units; runs it thru some formulas; stores it in both A(I,2) and A(I,3)";
23: if E(10)=0; goto #5
24: "Average all A(M,1)"; for M=0 to 19
25: A(M,1)/E(10);A(M,2);A(M,1)
26: next M
27: for M=1 to 10; K(M,1)/E(10);K(M,2);0;K(M,1);next M
28: E(10);D(27);0;E(10);E(41);D(28);E(11);D(29);E(12);D(30)
29: M(1);D(21);M(11);D(23);S(11);D(25);M(21);D(27);M(22);D(24);S(21);D(26);0;H(13)
30: /;d 0;val(7*15,41);E(41);D(29);E(46);D(30);E(47);D(32);E(10);D(24);D(20)
31:
32: "WDI":if A(9,2)<6.324+145+34A(9,2);A(9,3);jmp 2
33: -215+34A(9,2);A(9,3)
34: "WSEC":
35: 2*int(A(9,3)/10)+1-13W
36: if A(9,3)>230;W-36;W
37: if W>35;35;W
38: if A(9,3)>40 and A(9,3)<230;9;W
39: "TUR1":(1.07722810*(1-abs(A(1,2)/2)))^2*A(1,3)
40: "TUR2":(1.07722810*(1-abs(A(2,2)/2)))^2*A(2,3)
41: "DP1FCAL":r72;A(3,2)+r72*r67
42: "DP1":20.025+6.25047r67-4.04968e-2r67^2*A(3,3)
43: A(3,3)+1.43719e-3r67^3*A(3,3)
44: "DP2FCAL":r73;A(4,2)+r73*r67
45: "DP2":20.5158+6.06103r67-2.1513e-2r67^2*A(4,3)
46: A(4,3)+1.00459e-3r67^3*A(4,3)
47: "WSIEC":r75;"WSEC":r76
48: if A(5,2)<2.57;goto #3
49: "WS1":(3.08914e-2+1.93793A(5,2))-6.72817e-4A(5,2)^2+r75;A(5,3)
50: goto #3
51: "WS1":6.32834e-2+2.42269A(5,2)-.399002A(5,2)^2;A(5,3)
52: A(5,3)+8.27226e-2A(5,2)^3+r75;A(5,3)
53: if A(6,2)<2.558;goto #3
54: "WS2":(-1.81091+1.92438A(6,2)+1.55926e-4A(6,2)^2+r76)A(6,3)
55: goto #3
56: "WS2":7.13544e-2+2.52039A(6,2)-.404911A(6,2)^2;A(6,3)
57: A(6,3)+8.22668e-2A(6,2)^3+r76;A(6,3)
58: "BP2":9.4151e2+1.4123e1A(7,2)+2.2644e-1A(7,2)^2;A(7,3)
59: A(7,3)+1.41907e-2A(7,2)^3;A(7,3)
60: "SR":139.46A(8,2);A(8,3)
61: "MTBFCAL":r74;A(10,2)+r74*r67
62: "MTB":9.75329+.969791r67+.10789e-4r67^2;A(10,3)
63:
64: "ACF":56+A(11,2);A(11,3)
65: "ACV":90+10A(12,2);A(12,3)
66: "A(11 & 12)":A(10,2);A(10,3);A(19,2);A(19,3)
67: for M=0 to 19;A(M,3);D(M);0;A(M,3);A(M,2);D(M);next M
68: for M=1 to 9;if B(M,1)=0;goto "KNEXT"
69: for L=1 to 15
70: B(M,1)/B(M,16);D(M,1);0;B(M,1)
71: next L
72: 0;B(M,16)
73: "KNEXT":next M
74: for M=1 to 9;M(M,1);M(M,2);0;M(M,1);next M
75: "now store the data on disk"
76: open 4,D(18);E(1);K(1);U(1);O(Y)
77: ret
78: "FNZO":remove "CRUNCH";dep "CRUNCH saved";end
79:
80: "----- FIELD CALIBRATION FACTORS -----"
81:
82: "DP1FCAL":ret 0
83: "DP2FCAL":ret 0
84: "WSIEC":ret 1/(W(1),W,M+1)/1000
85: "WSEC":ret 1/(W(2),W,M+1)/1000
86: "MTBFCAL":ret 0
87:
88:1022

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20: "CRNCH0":
21: "This program is for use with (RECRNC)":
22: "Sub "CRNCH0" takes data from array A(I,J), puts it into engineering";
23: "units; runs it thru some formulas; stores it in both A(I,2) and A(I,3)";
24: E(41);D(28);E(11);D(29);E(12);D(30)
25:
26:
27: "WDI":if A(9,2)<6.324+145+34A(9,2);A(9,3);jmp 2
28: -215+34A(9,2);A(9,3)
29: "WSEC":
30: 2*int(A(9,3)/10)+1-13W
31: if A(9,3)>230;W-36;W
32: if W>35;35;W
33: if A(9,3)>40 and A(9,3)<230;9;W
34: "TUR1":(1.07722810*(1-abs(A(1,2)/2)))^2*A(1,3)
35: "TUR2":(1.07722810*(1-abs(A(2,2)/2)))^2*A(2,3)
36: "DP1FCAL":r72;A(3,2)+r72*r67
37: "DP1":20.025+6.25047r67-4.04968e-2r67^2*A(3,3)
38: A(3,3)+1.43719e-3r67^3*A(3,3)
39: "DP2FCAL":r73;A(4,2)+r73*r67
40: "DP2":20.5158+6.06103r67-2.1513e-2r67^2*A(4,3)
41: A(4,3)+1.00459e-3r67^3*A(4,3)
42: "WSIEC":r75;"WSEC":r76
43: if A(5,2)<2.57;goto #3
44: "WS1":(3.08914e-2+1.93793A(5,2))-6.72817e-4A(5,2)^2+r75;A(5,3)
45: goto #3
46: "WS1":6.32834e-2+2.42269A(5,2)-.399002A(5,2)^2;A(5,3)
47: A(5,3)+8.27226e-2A(5,2)^3+r75;A(5,3)
48: if A(6,2)<2.558;goto #3
49: "WS2":(-1.81091+1.92438A(6,2)+1.55926e-4A(6,2)^2+r76)A(6,3)
50: goto #3
51: "WS2":7.13544e-2+2.52039A(6,2)-.404911A(6,2)^2;A(6,3)
52: A(6,3)+8.22668e-2A(6,2)^3+r76;A(6,3)
53: "BP2":9.4151e2+1.4123e1A(7,2)+2.2644e-1A(7,2)^2;A(7,3)
54: A(7,3)+1.41907e-2A(7,2)^3;A(7,3)
55: "SR":139.46A(8,2);A(8,3)
56: "MTBFCAL":r74;A(10,2)+r74*r67
57: "MTB":9.75329+.969791r67+.10789e-4r67^2;A(10,3)
58:
59: "ACF":56+A(11,2);A(11,3)
60: "ACV":90+10A(12,2);A(12,3)
61: "A(11 & 12)":A(10,2);A(10,3);A(19,2);A(19,3)
62: for M=0 to 19
63: if M=13 or M=14 or M=17;goto #2
64: A(M,3);D(M)
65: next M
66: ret
67:
68: "FNZO":remove "CRNCH0";dep "CRNCH0 RE-MAVED";end
69:
70: "----- FIELD CALIBRATION FACTORS -----"
71: "DP1FCAL":ret r72
72: "DP2FCAL":ret r73
73: "WSIEC":ret 1/(W(1),W,M+1)/1000
74: "WSEC":ret 1/(W(2),W,M+1)/1000
75: "MTBFCAL":ret r74
76:
88:1020

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[illegible]

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200 PRINT3:
210 FMT 9,31x,"(Watts/m2) / 4x,"Z/L AT 21",18x,e9,2,zjwrt J+9,r57
220 FMT 9,30x,"ROUGHNESS LENGTH",18x,"N=POI.TEMP.",zjwrt J+9,r43
230 FMT 9,"(Kelvin)",6x,"N=POI.TEMP.(Kelvin)",zjwrt J+9,r43
240 FMT 9,40x,"(meters)",18x,"Z=HEIGHT (Meters)",8x,"Z=HEIGHT (M)",zjwrt J+9
250 FMT 9,"Vert.Axis",zjwrt J+9
260 FMT 9,e10,3,16x,"DP1/DZ=",e10,2,0x,"PS1=PS12",zjwrt J+9,r50,r57
270 FMT 9,4x,"Z/L AT 21",18x,"(Watts/m2)",zjwrt J+9
280 FMT 9,60x,"PIK SLOPE",AT 10 METERS",zjwrt J+9,r61,r44,D181
290 FMT 9,50x,"DRAG COEF. AT 10 METERS",zjwrt J+9
300 FMT 9,24x,"NOMIN.UBUKHOV LENGTH",7x,"TOTAL HEAT BUDGET FLUX",zjwrt J+9
310 FMT 9,4x,"(Dimensionless)",36x,"Z=HEIGHT (M) Vert.Axis",zjwrt J+9
320 FMT 9,4x,"(Meters)",19x,"(Meters/m2)",zjwrt J+9
330 FMT 9,15x,e10,3,41x,"PS1=PS12",zjwrt J+9,r69
340 FMT 9,4x,e10,3,17x,e9,2,zjwrt J+9,r42,r58
350 IF A12,11=1 AND A12,11(=1 AND A12,21)=1 AND A12,21(=1;gto +3
360 FMT 9,67x,"C12 SLOPE",e10,2,zjwrt J+9,r63
370 gto +2
380 FMT 9,67x,"C12 SLOPE DATA",zjwrt J+9,"0"3F6(7,7)
390 FMT 9,4x,"PS11 AT 21",f10,6,6x,"BOWEN RATIO",zjwrt J+9,r45
400 FMT 9,4x,"PS11 AT 22",f10,6,6x,"(no units)",zjwrt J+9,r46
410 FMT 9,4x,"PS12 AT 21",f10,6,2x,f10,3,zjwrt J+9,r47,r49
420 FMT 9,4x,"PS12 AT 22",f10,6,2,zjwrt J+9,r48
430 FMT 9,"GENERAL CONSTANTS",90x,"MISCELLANEOUS",zjwrt J+9
440 FMT 9,10x,""
450 FMT 9,"VON KARMAN GRAVITATION PROFILE",6x,"PROFILE",zjwrt J+9
460 FMT 9,6x,"BULK",9x,"BULK",35x,zjwrt J+9
470 FMT 9,10x,""
480 FMT 9,"CONSTANT",5x,"ACCELERATION TUR.PRANDTL",zjwrt J+9
490 FMT 9,"UR.SCHMIDT SEN HEAT",5x,"MOISTURE",30x,zjwrt J+9
500 FMT 9,10x,""
510 FMT 9,"(No units) (M/sec2)",4x,"NUMBER",7x,"NUMBER",zjwrt J+9
520 FMT 9,7x,"TRANSF.COEF.",zjwrt J+9
530 FMT 9,10x,""
540 FMT 9,"0.4",9x,"0.2959",7x,"0.74",9x,"0.74",zjwrt J+9
550 FMT 9,9x,"0.72E-03",5x,"1.32E-03",30x,zjwrt J+9
560 FMT 9,10x,""
570 FMT 9,"GENERAL NOTES",60x,zjwrt J+9,F13F,c11 'misc'
580 IF VAL(F4)=0; NONE"JAW1,100;gto +7
590 gsb "T"
600 FOR X=3 TO 7
610 IF F4(X,1)=0;gto +2
620 FMT 9,10x,"T",c11 'T';c11 'pr'
630 NEXT X
640 "JAW"
650 FOR X=1 TO 14-F;F13F;c11 'pr';JAW;next X
660 gto "ENDP3"
670 T=F4(X)
680 "Accuracy limitation exceeded for measurement of Profile "JAW
690 ASA"slope and/or Partial Derivative."JAW1,100;c11 'pr'
700 "Computation executed by insertion of:"JAW1,100
710 FMT 9,10x,"T",c11 'T';F13F;"JAW1,100;c11 'pr';next
720 T=F4(X)
730 "JAW"
740 ASA"U1-U2=0.076 of Mean Value."JAW1,100;next
750 ASA"U1-U2=0.076 of Mean Value."JAW1,100;next
760 ASA"PTK1-PTK2=0.008 Kel."JAW1,100;next
770 ASA"UPTK1-UPTK2=-0.009 Kel."JAW1,100;next
780 ASA"UPTK1-UPTK2=-0.009 of Mean Value."JAW1,100;next
790 "JAW"
800 "pr";FMT 9,4x,e10,6,zjwrt J+9,AS
810 c11 'misc';next
820 "JAW"
830 "misc";F13F;next
840 JAW
850 FMT 9,10x,""
860 FMT 9,3x,"AIR DENSITY",zjwrt J+9;next
870 FMT 9,3x,"(kg/m3)",zjwrt J+9;next
880 FMT 9,3x,e10,4,zjwrt J+9,r54;next
890 FMT 9,10x,""
900 FMT 9,3x,"AIR SPECIFIC HEAT",zjwrt J+9;next
910 FMT 9,3x,"(J/cal.Kg Kel.)",zjwrt J+9;next
920 FMT 9,3x,e10,4,zjwrt J+9,r71;next
930 FMT 9,10x,""
940 FMT 9,3x,"WATER LAT.HEAT VAP.",zjwrt J+9;next
950 FMT 9,3x,"(J/cal.Kg)",zjwrt J+9;next
960 FMT 9,3x,e10,4,zjwrt J+9,r13;next
970 FMT 9,10x,""
980 FMT 9,4x,"A CONTINUED ON NEXT PAGE",39x,zjwrt J+9;next J,AV
990 WITH 1,12;next
1000 "ENDP3"resave "PRINT3";dsc "PRINT3 RESAVED";end
815754

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440 gto +4
450 FMT 9,2x,e7,3,4x,e7,2,7x,e7,2,8x,"NO DATA",f12,2,f12,3,z
460 FMT 9,r13,r14,r15,r16,r17
470 FMT 9,6x,e7,3,6x,e7,3,6x,e7,3,zjwrt J+9,r18,r19,r20,r21
480 FMT 9,2x,"HEIGHT",7x,"PUT ILMF",4x,"VIR.TEMP.",4x,"V.POT.",zjwrt J+9
490 FMT 9,"ILMF",2x,"ABS.HUMID.",3x,"REL.HUMID.",3x,"SPEC.",zjwrt J+9
500 FMT 9,"HUMID.",2x,"VAP.PRES.",4x,"S.VAP.PRES.",2x,"REL.INDEX",zjwrt J+9
510 FMT 9,2x,"(Meters)",5x,"(Celsius)",4x,"(Celsius)",zjwrt J+9
520 FMT 9,4x,"(Celsius)",4x,"(kg/m3)",4x,"(Percent)",4x,"(kg/Kg)",zjwrt J+9
530 FMT 9,6x,"(Millibars)",2x,"(Millibars)",2x,"(Kelvin/2/3)",zjwrt J+9
540 IF A11,21=1 AND A11,21(=1 OR A12,21)=1 AND A12,21(=1;gto +4
550 FMT 9,1x,e7,2,3f13,3,7x,e9,3,e9,2,9x,e9,3,4x,e9,3,7x,e9,2,2,
560 FMT 9,1x,r22,r23,r24,r25,r26,r27,r28,r29,r30,r31
570 gto +3
580 FMT 9,1x,e7,2,3f13,3,7x,e9,3,e9,2,9x,e9,3,4x,e9,3,7x,"NO DATA",/
590 FMT 9,1x,r22,r23,r24,r25,r26,r27,r28,r29,r30
600 FMT
610
620 "ENDP3"resave "PRINT4";dsc "PRINT4 RESAVED";end
815754

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200 PRINT5:
210 FMT 9,"BULK AERODYNAMIC CALCULATIONS BASED ON ABOVE",zjwrt J+9
220 FMT 9,"(FRIEHE ET AL.1978)",zjwrt J+9
230 FMT 9,10x,"INFERRED",15x,"FLUX PARAMETERS",14x,"INFERRED",zjwrt J+9
240 FMT 9,12x,"INFERRED MEAN VERTICAL",zjwrt J+9
250 FMT 9,10x,"STABILITY",15x,"(UP,DOWN)",10x,"SCALING",zjwrt J+9
260 FMT 9,"PARAMETERS",7x,"VELOCITY COVARIANCE",9x,"MISCELLANEOUS",zjwrt J+9
270 FMT 9,10x,""
280 FMT 9,6x,""
290 FMT 9,4x,""
300 FMT 9,4x,""
310 FMT 9,4x,"GRAD.RICHARDSON NUMBER",5x,"MOMENTUM FLUX",12x,zjwrt J+9
320 FMT 9,"FRICTION VELOCITY",9x,"WITH LONG. VELOCITY",zjwrt J+9
330 FMT 9,"AIR DENSITY",zjwrt J+9
340 FMT 9,4x,"(x=Stable, x=Unstable)",6x,"(M/m2)",18x,"(Meters)",zjwrt J+9
350 FMT 9,"(sec)",14x,"(meter2/sec2)",12x,"(kg/m3)",zjwrt J+9
360 FMT 9,1x,e9,3,9x,e9,2,16x,e10,3,16x,e10,3,11x,f10,4,
370 FMT 9,2,r40,"AT 10M",r55,r49,r53,r54
380 FMT 9,4x,"GEOMETRIC MEAN HEIGHT",6x,"HUMIDITY FLUX",12x,zjwrt J+9
390 FMT 9,"GEOMETRIC MEAN HEIGHT",7x,"WITH ABS. HUMIDITY",zjwrt J+9
400 FMT 9,"AIR SPECIFIC HEAT",zjwrt J+9
410 FMT 9,4x,"(meter) UML(21821/2)",5x,"(kg/sec m2)",14x,"(kg)",zjwrt J+9
420 FMT 9,"kg",19x,"(meter Kg/sec m3)",8x,"(J/cal.Kg Kel.)",zjwrt J+9
430 FMT 9,3x,e7,2,21x,e9,2,16x,e10,3,16x,e10,3,15x,e10,4,
440 FMT 9,2,r64,r56,r51,r56,r71
450 FMT 9,4x,"Z/L AT 21",15x,"TOTAL HEAT FLUX",12x,"SCALING POT.",zjwrt J+9
460 FMT 9,"(M)",9x,"WITH LONG. VELOCITY",15x,"WATER LAT HEAT VAP.",zjwrt J+9
470 FMT 9,3x,e7,3,21x,"(Watts/m2)",15x,"(Kelvin)",18x,zjwrt J+9,r41
480 FMT 9,"(meter Kel./sec)",9x,"(J/cal.Kg)",zjwrt J+9
490 FMT 9,3x,e9,2,16x,e10,3,16x,e10,3,15x,e10,4,zjwrt J+9,r81,r52,r38,r66
500 FMT 9,4x,"Z/L AT 10 METERS",zjwrt J+9
510 FMT 9,4x,e7,3,21x,"TOTAL HEAT FLUX",12x,"ROUGHNESS LENGTH",zjwrt J+9,r76
520 FMT 9,3x,"VAP.PRES. AT 10 METERS",zjwrt J+9
530 FMT 9,3x,"(Watts/m2)",15x,"(Meters)",43x,"(Millibars)",zjwrt J+9
540 FMT 9,4x,"NOMIN.UBUKHOV LENGTH",6x,e10,2,15x,e11,3,4x,e10,3
550 FMT 9,2,r57,r56,r61
560 FMT 9,4x,"(Meters)",zjwrt J+9,e10,3,zjwrt J+9,r42
570 FMT 9,17x,"SKY AND SOLAR HEAT FLUX",zjwrt J+9
580 FMT 9,"DRAG COEF. AT 10 METERS",29x,"ABS.HUMID. AT 10 METERS",zjwrt J+9
590 FMT 9,31x,"(Watts/m2)",15x,"(Dimensionless)",36x,"(kg/m3)",zjwrt J+9
600 FMT 9,30x,e10,2,15x,e11,3,zjwrt J+9,r18,r19,r20,r21
610 FMT 9,31x,"TOTAL HEAT BUDGET FLUX",14x,"PRES. AT 10 METERS",zjwrt J+9
620 FMT 9,31x,"(Watts/m2)",66x,"(Millibars)",zjwrt J+9
630 FMT 9,30x,e10,2,15x,e11,3,zjwrt J+9,r58,r60
640 FMT 9,31x,"BOWEN RATIO",zjwrt J+9,"(no units)",zjwrt J+9,r45
650 FMT 9,"MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN",zjwrt J+9
660 FMT 9,"CURRENT MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN",zjwrt J+9
670 FMT 9,"CURRENT MEASUREMENT ERROR ANALYSIS OF PARAMETERS LISTED IN",zjwrt J+9
680 FMT 9,"APPROXIMATE AND ACTUAL",zjwrt J+9
690 FMT 9,3x,"GRAD WITH",zjwrt J+9,"MOMENTUM LAT HEAT",zjwrt J+9
700 FMT 9,"SEN HEAT",zjwrt J+9,"TOTAL HEAT BOWEN FRICTION",zjwrt J+9
710 FMT 9,"(M)",zjwrt J+9,"ROUGH",zjwrt J+9
720 FMT 9,3x,"GEOMETRIC MEAN HEIGHT",zjwrt J+9,"HUMIDITY FLUX",zjwrt J+9
730 FMT 9,3x,"GEOMETRIC MEAN HEIGHT",zjwrt J+9,"VELOCITY COVARIANCE",zjwrt J+9
740 FMT 9,3x,"TEMP. COV.",zjwrt J+9,"COEF.",zjwrt J+9
750 FMT 9,4x,e10,3,zjwrt J+9
760 FMT 9,4x,e10,3,zjwrt J+9
770 FMT 9,4x,"(M)",zjwrt J+9,r82
780 FMT 9,1x,e10,3,zjwrt J+9,r82
790 FMT 9,1x,e10,3,zjwrt J+9,r82
800 FMT 9,1x,e10,3,zjwrt J+9,r82
810 FMT 9,1x,e10,3,zjwrt J+9,r82
820 FMT 9,1x,e10,3,zjwrt J+9,r82
830 FMT 9,1x,e10,3,zjwrt J+9,r82
840 FMT 9,1x,e10,3,zjwrt J+9,r82
850 FMT 9,1x,e10,3,zjwrt J+9,r82
860 FMT 9,1x,e10,3,zjwrt J+9,r82
870 FMT 9,1x,e10,3,zjwrt J+9,r82
880 FMT 9,1x,e10,3,zjwrt J+9,r82
890 FMT 9,1x,e10,3,zjwrt J+9,r82
900 FMT 9,1x,e10,3,zjwrt J+9,r82
910 FMT 9,1x,e10,3,zjwrt J+9,r82
920 FMT 9,1x,e10,3,zjwrt J+9,r82
930 FMT 9,1x,e10,3,zjwrt J+9,r82
940 FMT 9,1x,e10,3,zjwrt J+9,r82
950 FMT 9,1x,e10,3,zjwrt J+9,r82
960 FMT 9,1x,e10,3,zjwrt J+9,r82
970 FMT 9,1x,e10,3,zjwrt J+9,r82
980 FMT 9,1x,e10,3,zjwrt J+9,r82
990 FMT 9,1x,e10,3,zjwrt J+9,r82
1000 "ENDP5"resave "PRINT5";dsc "PRINT5 RESAVED";end
815754

```









```

20: *TIDPKT*:
21:
22: This program prints tide data from file TIDEI*:
23:
24: Dim T(496),A$(10)
25: Files TIDEI:read 1,t0
26:
27: ent "ENTER MONTH TABLE BEGINS: ",A$;cap(h$1,4))A$
28: ent "ENTER YEAR: ",Y
29: *PRINTER*:7000P
30: fnt 1,20,,"TIDE Table FOR",wrt P+1
31: fnt 1,22,c4,x,f4.0,;wrt P+1,A$,Y
32: l33;l3D
33: fnt 1,f2.0,2,x;wrt P+.1,D
34: for I=1 to len(f%) by 4
35: t=f(f4.1,(1+1)),;t=f(T(I+2,I+3))/10)B
36: fnt 1,T(I,0),2,x,f4.1,4,x;wrt P+.1,A$,B
37: J=J+J
38: if J<9;gto +4
39: D=D+D
40: if I=len(f%)-4;fnt 1,/,f2.0,2,x;wrt P+.1,D
41: l33
42: next I
43: wrt P;wtb P,l32
44: dsp "DONE";end
45:
46: *FNZO:remove "TIDPKT";dsp "TIDPKT RESAVED";end
47:05

```

```

21: "MAIN"
22:
23: "This program reads raw and calculated data previously recorded"
24: "on disk and computes Mean and Standard Deviation"
25: "Values can be variables or expressions"
26:
27: "It contains the usual printout values"
28: "It contains entered arithmetic expressions: Julian, April, May"
29: "Temporary storage for D120(1), D120(2), D120(3), D120(4)"
30: "Overriding percent, D120(1), D120(2), D120(3), D120(4)"
31: "Temp range(12), F1131-overriding rate for Knuttenburg"
32: "It contains the overruled digital data"
33: "It contains the converted analog data"
34: "It initializes data tables"
35: dim D120(5), F1131(12), D120(1), D120(2), D120(3), D120(4)
36: dim H120(1), H120(2), H120(3), H120(4), H120(5), H120(6)
37: PKINITE% = 0
38: cll: cll:
39: RUN% = 0
40: read D120(1), D120(2), D120(3), D120(4)
41: "RUN% read 4, but 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762,
```

```

20: "MAXMIN":
21:
22: "This program reads raw and calculated data previously recorded"
23: "on disc and computes MAXIMUM and MINIMUM VALUES"
24: "Values can be variables or expressions":
25:
26: "D contains the final printout values":
27: "E contains entered month(1), day(12), julian day(1), 141"
28: "temporary storage for U(111), V(1), and U(12), V(12)"
29: "averaging period(19); Divergence(10); Parity error(11)"
30: "temp range(12), E(13)=sampling rate for Knollenburg"
31: "K contains the averaged digital data":
32: "U contains the converted analog data":
33: "initializing data follows":
34: dim D(0:50),E(1:3),K(10:2),U(0:19),G(1:3),P(5)
35: dim A$(1:5),B$(20),C$(10),F$(7),G$(12,3),H$(15),S$(15)
36: "PRINTER":700)P
37: cfb 1,2
38: "NONE":B$(C)F$
39: files DATE, TIME, CW-DAP, METDAT:read 1,C$,G(0)
40: "ASK":read 4,1;ent "ENTER BEGINING RUN NUMBER (U for all)";P(1)
41: if P(1)=0;sfq 2;gto +3
42: if flq1;gto "MAIN"
43: ent "ENTER ENDING RUN NUMBER: ";P(2)
44: ent "EXPERIMENT DATE ? ";A$;cap(A$)A$
45: ent "ENTER EXPRESSION (RI,RIB-RI,etc)";B$;cap(B$)B$
46: ent "UNITS: ";C$;cap(C$)C$
47: ent "ENTER OR CHANGE EXPRESSION? ";F$;cap(F$)F$
48: if F$(1,1)!="Y";gto +3
49: on end 4,"END"
50: gto "MAIN"
51:
52: dsp "ENTER EXPI BELOW THEN (cont 40)";stp
53: "Add 100 to all page 3 variables":
54:
55: "EXPI":ret r121
56:
57:
58:
59:
60:
61:
62: "MAIN":dsp "FINDING BEGINING RUN NUMBER"
63: "This routine finds begining data run":
64: cfb 1
65: cll "READDATA"
66: if flq2;D(20)P(1);gto +4
67: if D(20)P(1);dsp "BEGINING RUN NUMBER NOT FOUND";wait 5000;sfq 1
68: if flq1;gto "ASK"
69: if D(20)abs(P(1));gto "MAIN"
70:
71:
72: 0)N;"EXPI":A)D
73: "on":
74: "Compute mean and standard deviation":
75: on end 4,"END"
76: "EXPI":X
77: fnd 0;dsp "COMPUTING" RUN# ",D(20)
78: N=1;N;fnd X(A);X(A)
79: if X(0);X(0)
80: cll "READDATA"
81: if flq2;gto +2
82: if D(20)P(2);gto "END"
83: gto +7
84:
85: "READDATA":
86: "This sub routine reads data from disc":
87: read 4,D(1),E(1),K(1),U(1)
88: for 1=1 to 100;read 4,1;next 1;read 4,F$
89: for 1=109 to 216;read 4,1;next 1;read 4,F$
90: ret
91:
92: "END":
93: "N":F$;ent "MORE DATA TO RUN? ";F$;cap(F$)F$
94: if F$(1,1)!="Y";gto +3
95: dsp "INSERT NEXT DISC" ;jsta
96: asgn "METDAT",4;read 4,1;gto "mean"
97: cll "TITLE"
98: if flq2;D(20)P(2)
99: fnd 0;str(N)F$,fnd 3;str(A)H$,str(D)H$
100: fnt 1,11x,"BEGINING RUN #";f11.0,2;fnt P+1,P(1)
101: fnt 1,12x,"ENDING RUN #";f11.0,2;fnt P+1,P(2)
102: fnt 1,10x,"MIN #";5x,2;fnt P+1;fnt P,H$
103: fnt 1,10x,"MAX #";5x,2;fnt P+1;fnt P,H$
104: fnt 1,11x,"NUMBER OF SAMPLES #";2;fnt P+1;fnt P,H$
105: wtb P,12
106: dsp "DONL";end
107:
108: "TITLE":
109: B$(B$1,20);C$(C$1,10)
110: fnt 1,10x,"T. PLANT NRI CODE 4320 CNI ";fnt P+1;fnt P,H$
111: fnt 1,11x,"EXPRESSION# ";c20,2x,"UNITS# ";c10;fnt P+1,B$,C$
112: ret
113:
114: "FNZO":remove "MAXMIN";dsp "MAXMIN RESAUID";end
115:
116: "FUNCTIONS":
117: "PHSD":ret r5-r6
118: "BNSD":ret abs(CA#37/1/UTKM#121/1#64#1nrc5/rob)
119: "GA":ret 9.7959
120: "UTKM":ret (UTK1+UTK2)/2
121: "UTK1":ret (UTK1+.0098865
122: "UTK2":ret (UTK2+.0098866
123: "ATK1":ret (ATK1#(1+25#.608)
124: "ATK2":ret (ATK2#(1+25#.608)
125: "ATK1":ret r1+273.15
126: "ATK2":ret r2+273.15
127:
128:
129:
130:
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132:
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20: "DELET"
21:
22: "This program reads data from disc and deletes"
23: "deletes of copy's specified run number"
24: "New disc must have all programs and data deleted"
25: "and file METDAT open to allow recovery"
26:
27: "initializing data follows"
28: dim D(0:50),E(1:3),K(10:2),U(0:19),G(1:3),P(5)
29: dim A$(1:5),B$(20),C$(10),F$(7),G$(12,3),H$(15),S$(15)
30: cfb 1
31: "PRINTER":700)P
32: files METDAT,0,METDAT:
33: read 1,1
34: ent "COPY OR DELETE? SET FILE RUN# (1=delete, 2=copy)"
35: if A$="COPY";sfq 1
36: "ASK":read 1,1;"YES"
37: for A=1 to 200
38: ent "ENTER RUN # (000 to terminate)"
39: if A$="000";gto +4
40: if len(A$)>10;gto +3
41: dsp;prt A$;dsp "TYPE IN RUN# KI ENTER NUMBER";wait 1000
42: gto +4
43: N=A;"AASINS"
44: next A
45: ent "PRINT LIST OF ENTERED NUMBERS";w;cap(A$)A$
46: if A$(1,1)!="Y";gto +12
47: for X=1 to len(A$) by 11
48: wtb 10,N(A$),A(10)
49: next X
50: ent "DELETE NUMBER#?";w;cap(A$)A$
51: if A$="000";gto +12
52: ent "ENTER NUMBER TO CHANGE (000 to delete)"
53: if A$="000";gto +10
54: pos(N$,"AASINS");X=X+10;gto +2
55: dsp;dsp "NUMBER NOT FOUND";ret 100;gto +10
56: prt A$X,A(10)
57: A$;ent "ENTER NEW NUMBER"
58: if A$="";N(A$)=X+10;X=X+10;gto +2
59: if len(A$)>10;gto +3
60: dsp;prt A$;dsp "TYPE IN RUN# KI ENTER NUMBER";wait 1000
61: A$;N(A$),A(10);gto +9
62:
63: on end 3 "ASK2"
64: "MAIN":read 1,D(1),E(1),K(1),U(1)
65: for 1=1 to 100;read 1,1;next 1;read 4,F$
66: for 1=109 to 216;read 1,1;next 1;read 4,F$
67: fnd 0;str(N)F$,fnd 3;str(A)H$,str(D)H$
68: fnt 1,11x,"BEGINING RUN #";f11.0,2;fnt P+1,P(1)
69: fnt 1,12x,"ENDING RUN #";f11.0,2;fnt P+1,P(2)
70: fnt 1,10x,"MIN #";5x,2;fnt P+1;fnt P,H$
71: fnt 1,10x,"MAX #";5x,2;fnt P+1;fnt P,H$
72: fnt 1,11x,"NUMBER OF SAMPLES #";2;fnt P+1;fnt P,H$
73: wtb P,12
74: dsp "DONL";end
75:
76: "TITLE":
77: B$(B$1,20);C$(C$1,10)
78: fnt 1,10x,"T. PLANT NRI CODE 4320 CNI ";fnt P+1;fnt P,H$
79: fnt 1,11x,"EXPRESSION# ";c20,2x,"UNITS# ";c10;fnt P+1,B$,C$
80: ret
81:
82: "FNZO":remove "MAXMIN";dsp "MAXMIN RESAUID";end
83:
84: "FUNCTIONS":
85: "PHSD":ret r5-r6
86: "BNSD":ret abs(CA#37/1/UTKM#121/1#64#1nrc5/rob)
87: "GA":ret 9.7959
88: "UTKM":ret (UTK1+UTK2)/2
89: "UTK1":ret (UTK1+.0098865
90: "UTK2":ret (UTK2+.0098866
91: "ATK1":ret (ATK1#(1+25#.608)
92: "ATK2":ret (ATK2#(1+25#.608)
93: "ATK1":ret r1+273.15
94: "ATK2":ret r2+273.15
95:
96:
97:
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[illegible]

$\frac{d}{dt} \left( \frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$

```

1  # Import the data from the file
2  data = pd.read_csv('data.csv')
3
4  # Print the first 5 rows of the data
5  print(data.head())
6
7  # Print the last 5 rows of the data
8  print(data.tail())
9
10 # Print the shape of the data
11 print(data.shape)
12
13 # Print the data types of the columns
14 print(data.dtypes)
15
16 # Print the number of rows in the data
17 print(data.count())
18
19 # Print the number of columns in the data
20 print(data.columns)
21
22 # Print the unique values of the 'category' column
23 print(data['category'].unique())
24
25 # Print the unique values of the 'value' column
26 print(data['value'].unique())
27
28 # Print the unique values of the 'date' column
29 print(data['date'].unique())
30
31 # Print the unique values of the 'time' column
32 print(data['time'].unique())
33
34 # Print the unique values of the 'location' column
35 print(data['location'].unique())
36
37 # Print the unique values of the 'status' column
38 print(data['status'].unique())
39
40 # Print the unique values of the 'type' column
41 print(data['type'].unique())
42
43 # Print the unique values of the 'id' column
44 print(data['id'].unique())
45
46 # Print the unique values of the 'name' column
47 print(data['name'].unique())
48
49 # Print the unique values of the 'email' column
50 print(data['email'].unique())
51
52 # Print the unique values of the 'phone' column
53 print(data['phone'].unique())
54
55 # Print the unique values of the 'address' column
56 print(data['address'].unique())
57
58 # Print the unique values of the 'city' column
59 print(data['city'].unique())
60
61 # Print the unique values of the 'state' column
62 print(data['state'].unique())
63
64 # Print the unique values of the 'zip' column
65 print(data['zip'].unique())
66
67 # Print the unique values of the 'country' column
68 print(data['country'].unique())
69
70 # Print the unique values of the 'continent' column
71 print(data['continent'].unique())
72
73 # Print the unique values of the 'region' column
74 print(data['region'].unique())
75
76 # Print the unique values of the 'subregion' column
77 print(data['subregion'].unique())
78
79 # Print the unique values of the 'major_group' column
80 print(data['major_group'].unique())
81
82 # Print the unique values of the 'minor_group' column
83 print(data['minor_group'].unique())
84
85 # Print the unique values of the 'age_group' column
86 print(data['age_group'].unique())
87
88 # Print the unique values of the 'sex' column
89 print(data['sex'].unique())
90
91 # Print the unique values of the 'marital_status' column
92 print(data['marital_status'].unique())
93
94 # Print the unique values of the 'employment_status' column
95 print(data['employment_status'].unique())
96
97 # Print the unique values of the 'education_level' column
98 print(data['education_level'].unique())
99
100 # Print the unique values of the 'income_level' column
101 print(data['income_level'].unique())
102
103 # Print the unique values of the 'poverty_status' column
104 print(data['poverty_status'].unique())
105
106 # Print the unique values of the 'health_status' column
107 print(data['health_status'].unique())
108
109 # Print the unique values of the 'mental_health_status' column
110 print(data['mental_health_status'].unique())
111
112 # Print the unique values of the 'physical_health_status' column
113 print(data['physical_health_status'].unique())
114
115 # Print the unique values of the 'chronic_disease_status' column
116 print(data['chronic_disease_status'].unique())
117
118 # Print the unique values of the 'acute_disease_status' column
119 print(data['acute_disease_status'].unique())
120
121 # Print the unique values of the 'injury_status' column
122 print(data['injury_status'].unique())
123
124 # Print the unique values of the 'disability_status' column
125 print(data['disability_status'].unique())
126
127 # Print the unique values of the 'long_term_disability_status' column
128 print(data['long_term_disability_status'].unique())
129
130 # Print the unique values of the 'short_term_disability_status' column
131 print(data['short_term_disability_status'].unique())
132
133 # Print the unique values of the 'temporary_disability_status' column
134 print(data['temporary_disability_status'].unique())
135
136 # Print the unique values of the 'permanent_disability_status' column
137 print(data['permanent_disability_status'].unique())
138
139 # Print the unique values of the 'total_disability_status' column
140 print(data['total_disability_status'].unique())
141
142 # Print the unique values of the 'partial_disability_status' column
143 print(data['partial_disability_status'].unique())
144
145 # Print the unique values of the 'full_disability_status' column
146 print(data['full_disability_status'].unique())
147
148 # Print the unique values of the 'no_disability_status' column
149 print(data['no_disability_status'].unique())
150
151 # Print the unique values of the 'unknown_disability_status' column
152 print(data['unknown_disability_status'].unique())
153
154 # Print the unique values of the 'disability_reason' column
155 print(data['disability_reason'].unique())
156
157 # Print the unique values of the 'disability_date' column
158 print(data['disability_date'].unique())
159
160 # Print the unique values of the 'disability_duration' column
161 print(data['disability_duration'].unique())
162
163 # Print the unique values of the 'disability_severity' column
164 print(data['disability_severity'].unique())
165
166 # Print the unique values of the 'disability_impact' column
167 print(data['disability_impact'].unique())
168
169 # Print the unique values of the 'disability_treatment' column
170 print(data['disability_treatment'].unique())
171
172 # Print the unique values of the 'disability_prevention' column
173 print(data['disability_prevention'].unique())
174
175 # Print the unique values of the 'disability_rehabilitation' column
176 print(data['disability_rehabilitation'].unique())
177
178 # Print the unique values of the 'disability_support' column
179 print(data['disability_support'].unique())
180
179

```

[illegible][illegible]

```

00000000: 7f f1 11 11 "N" 0to "-RV"
00000004: d9p "ENTER EXP1&2" RETURN THEN (count 70)"exp
00000008: n0:
0000000c: "EXP1&2 done & return"
00000010: n: "had 100 to add pay- 3 variables"
00000014: b5
00000018: d9p
0000001c: r0:
00000020: "EXP1" exit
00000024: r0:
00000028: "EXP2" exit
0000002c: r0:
00000030: b5
00000034: r0:

```

[illegible][illegible]

```

1000  PRINT "***** END OF MAIN PROGRAM *****"
1010  END
1020
1030
1040
1050
1060  PRINT "***** FROM GALS AND PLUT *****"
1070
1080
1090
1100  GOTO "GITT"
1110
1120  FOR GALS=0 TO 10000
1130  GOTO "DECIMAL"
1140  NEXT GALS
1150  PRINT "*****"

```

```

1  # 计算每个样本的欧氏距离
2  def euclidean_distance(x1, x2):
3      return np.sqrt(np.sum((x1 - x2)**2))
4
5  # 计算每个样本到每个簇中心的距离
6  def calculate_distances(X, centroids):
7      distances = np.zeros((X.shape[0], centroids.shape[0]))
8      for i in range(X.shape[0]):
9          for j in range(centroids.shape[0]):
10             distances[i, j] = euclidean_distance(X[i], centroids[j])
11
12     return distances
13
14 # 根据距离分配簇
15 def assign_clusters(X, centroids, distances):
16     clusters = np.zeros(X.shape[0])
17     for i in range(X.shape[0]):
18         cluster = np.argmin(distances[i])
19         clusters[i] = cluster
20
21     return clusters
22
23 # 计算每个簇的新质心
24 def calculate_new_centroids(X, clusters):
25     new_centroids = np.zeros(centroids.shape)
26     for i in range(clusters.shape[0]):
27         cluster = clusters[i]
28         new_centroids[cluster] += X[i]
29
30     return new_centroids
31
32 # K-Means 聚类算法
33 def kmeans(X, K):
34     # 初始化质心
35     centroids = X[np.random.choice(X.shape[0], K)]
36
37     # 迭代直到收敛
38     while True:
39         # 计算每个样本到每个簇中心的距离
40         distances = calculate_distances(X, centroids)
41
42         # 根据距离分配簇
43         clusters = assign_clusters(X, centroids, distances)
44
45         # 计算每个簇的新质心
46         new_centroids = calculate_new_centroids(X, clusters)
47
48         # 检查是否收敛
49         if np.allclose(centroids, new_centroids):
50             break
51
52         centroids = new_centroids
53
54     return centroids, clusters
55
56 # 测试
57 X = np.random.rand(100, 2)
58 K = 3
59 centroids, clusters = kmeans(X, K)
60
61 # 打印结果
62 print("Cluster Centers:")
63 print(centroids)
64 print("Cluster Assignments:")
65 print(clusters)

```

[illegible][illegible]

```

161: if (d12>255) i=1, goto "END"
162: call "PROMPT"
163: read a string d12:100
164: if (d12="END")
165:   goto "print"
166:
167: "PROMPT":
168: "This sub routine reads data from disk."
169: read a word d1:10, a word d2:10
170: for i=1 to 10, read 4, i, next i, read 4, i
171: for i=1 to 2, read 4, i, next i, read 4, i
172: next
173:

```

```

104: "pt1"
105: if P1==0: f15, f16, f17, q10 = 4
106: if P1==1: f14, f15, f16, f17, q10 = 5
107: if f15==0: f16, f17, f18, f19, f20, f21, q10 = 7
108: p11 = f15
109: f15 = f16
110: f16 = f17
111: f17 = f18
112: f18 = f19
113: f19 = f20
114: f20 = f21
115: f21 = f15
116: f15 = f16
117: f16 = f17
118: f17 = f18
119: f18 = f19
120: f19 = f20
121: f20 = f21
122: f21 = f15
123: f15 = f16
124: f16 = f17
125: f17 = f18
126: f18 = f19
127: f19 = f20
128: f20 = f21
129: f21 = f15
130: f15 = f16
131: f16 = f17
132: f17 = f18
133: f18 = f19
134: f19 = f20
135: f20 = f21
136: f21 = f15
137: f15 = f16
138: f16 = f17
139: f17 = f18
140: f18 = f19
141: f19 = f20
142: f20 = f21
143: f21 = f15
144: f15 = f16
145: f16 = f17
146: f17 = f18
147: f18 = f19
148: f19 = f20
149: f20 = f21
150: f21 = f15
151: f15 = f16
152: f16 = f17
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155: f19 = f20
156: f20 = f21
157: f21 = f15
158: f15 = f16
159: f16 = f17
160: f17 = f18
161: f18 = f19
162: f19 = f20
163: f20 = f21
164: f21 = f15
165: f15 = f16
166: f16 = f17
167: f17 = f18
168: f18 = f19
169: f19 = f20
170: f20 = f21
171: f21 = f15
172: f15 = f16
173: f16 = f17
174: f17 = f18
175: f18 = f19
176: f19 = f20
177: f20 = f21
178: f21 = f15
179: f15 = f16
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183: f19 = f20
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189: f18 = f19
190: f19 = f20
191: f20 = f21
192: f21 = f15
193: f15 = f16
194: f16 = f17
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196: f18 = f19
197: f19 = f20
198: f20 = f21
199: f21 = f15
200: f15 = f16
201: f16 = f17
202: f17 = f18
203: f18 = f19
204: f19 = f20
205: f20 = f21
206: f21 = f15
207: f15 = f16
208: f16 = f17
209: f17 = f18
210: f18 = f19
211: f19 = f20
212: f20 = f21
213: f21 = f15
214: f15 = f16
215: f16 = f17
216: f17 = f18
217: f18 = f19
218: f19 = f20
219: f20 = f21
220: f21 = f15
221: f15 = f16
222: f16 = f17
223: f17 = f18
224: f18 = f19
225: f19 = f20
226: f20 = f21
227: f21 = f15
228: f15 = f16
229: f16 = f17
230: f17 = f18
231: f18 = f19
232: f19 = f20
233: f20 = f21
234: f21 = f15
235: f15 = f16
236: f16 = f17
237: f17 = f18
238: f18 = f19
239: f19 = f20
240: f20 = f21
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242: f15 = f16
243: f16 = f17
244: f17 = f18
245: f18 = f19
246: f19 = f20
247: f20 = f21
248: f21 = f15
249: f15 = f16
250: f16 = f17
251: f17 = f18
252: f18 = f19
253: f19 = f20
254: f20 = f21
255: f21 = f15
256: f15 = f16
257: f16 = f17
258: f17 = f18
259: f18 = f19
260: f19 = f20
261: f20 = f21
262: f21 = f15
263: f15 = f16
264: f16 = f17
265: f17 = f18
266: f18 = f19
267: f19 = f20
268: f20 = f21
269: f21 = f15
270: f15 = f16
271: f16 = f17
272: f17 = f18
273: f18 = f19
274: f19 = f20
275: f20 = f21
276: f21 = f15
277: f15 = f16
278: f16 = f17
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281: f19 = f20
282: f20 = f21
283: f21 = f15
284: f15 = f16
285: f16 = f17
286: f17 = f18
287: f18 = f19
288: f19 = f20
289: f20 = f21
290: f21 = f15
291: f15 = f16
292: f16 = f17
293: f17 = f18
294: f18 = f19
295: f19 = f20
296: f20 = f21
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310: f20 = f21
311: f21 = f15
312: f15 = f16
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315: f18 = f19
316: f19 = f20
317: f20 = f21
318: f21 = f15
319: f15 = f16
320: f16 = f17
321: f17 = f18
322: f18 = f19
323: f19 = f20
324: f20 = f21
325: f21 = f15
326: f15 = f16
327: f16 = f17
328: f17 = f18
329: f18 = f19
330: f19 = f20
331: f20 = f21
332: f21 = f15
333: f15 = f16
334: f16 = f17
335: f17 = f18
336: f18 = f19
337: f19 = f20
338: f20 = f21
339: f21 = f15
340: f15 = f16
341: f16 = f17
342: f17 = f18
343: f18 = f19
344: f19 = f20
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346: f21 = f15
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384: f17 = f18
385: f18 = f19
386: f19 = f20
387: f20 = f21
388: f21 = f15
389: f15 = f16
390: f16 = f17
391: f17 = f18
392: f18 = f19
393: f19 = f20
394: f20 = f21
395: f21 = f15
396: f15 = f16
397: f16 = f17
398: f17 = f18
399: f18 = f19
400: f19 = f20
401: f20 = f21
402: f21 = f15
403: f15 = f16
404: f16 = f17
405: f17 = f18
406: f18 = f19
407: f19 = f20
408: f20 = f21
409: f21 = f15
410: f15 = f16
411: f16 = f17
412: f17 = f18
413: f18 = f19
414: f19 = f20
415: f20 = f21
416: f21 = f15
417: f15 = f16
418: f16 = f17
419: f17 = f18
420: f18 = f19
421: f19 = f20
422: f20 = f21
423: f21 = f15
424: f15 = f16
425: f16 = f17
426: f17 = f18
427: f18 = f19
428: f19 = f20
429: f20 = f21
430: f21 = f15
431: f15 = f16
432: f16 = f17
433: f17 = f18
434: f18 = f19
435: f19 = f20
436: f20 = f21
437: f21 = f15
438: f15 = f16
439: f16 =
```

```

202:         p[0] = p[0] + p[1]*p[2]; p[1] = p[1]*p[2];
203:     }
204:     if (v1[0]<v1[1] || (v1[0]==v1[1] and v1[4]<v1[5] || v1[4]==v1[5] and
205:         v1[6]<v1[7])) {
206:         p[0] = v1[0]; p[1] = v1[1]; p[2] = v1[2];
207:         v1[0] = v1[3]; v1[1] = v1[4]; v1[2] = v1[5];
208:         v1[3] = v1[6]; v1[4] = v1[7];
209:     }
210:     p[0] = p[0]*p[1]; p[1] = p[1]*p[2];
211:     p[2] = p[2]*p[3];
212:     return p[0];
213: }
214:
215: void EXP3::init() {
216:     abs_v[1][1][1] = 0; abs_v[1][1][2] = 0; abs_v[1][1][3] = 0;
217:     abs_v[1][2][1] = 0; abs_v[1][2][2] = 0; abs_v[1][2][3] = 0;
218:     abs_v[1][3][1] = 0; abs_v[1][3][2] = 0; abs_v[1][3][3] = 0;
219:     abs_v[2][1][1] = 0; abs_v[2][1][2] = 0; abs_v[2][1][3] = 0;
220:     abs_v[2][2][1] = 0; abs_v[2][2][2] = 0; abs_v[2][2][3] = 0;
221:     abs_v[2][3][1] = 0; abs_v[2][3][2] = 0; abs_v[2][3][3] = 0;
222:     abs_v[3][1][1] = 0; abs_v[3][1][2] = 0; abs_v[3][1][3] = 0;
223:     abs_v[3][2][1] = 0; abs_v[3][2][2] = 0; abs_v[3][2][3] = 0;
224:     abs_v[3][3][1] = 0; abs_v[3][3][2] = 0; abs_v[3][3][3] = 0;
225:     abs_v[4][1][1] = 0; abs_v[4][1][2] = 0; abs_v[4][1][3] = 0;
226:     abs_v[4][2][1] = 0; abs_v[4][2][2] = 0; abs_v[4][2][3] = 0;
227:     abs_v[4][3][1] = 0; abs_v[4][3][2] = 0; abs_v[4][3][3] = 0;
228:     abs_v[5][1][1] = 0; abs_v[5][1][2] = 0; abs_v[5][1][3] = 0;
229:     abs_v[5][2][1] = 0; abs_v[5][2][2] = 0; abs_v[5][2][3] = 0;
230:     abs_v[5][3][1] = 0; abs_v[5][3][2] = 0; abs_v[5][3][3] = 0;
231:     abs_v[6][1][1] = 0; abs_v[6][1][2] = 0; abs_v[6][1][3] = 0;
232:     abs_v[6][2][1] = 0; abs_v[6][2][2] = 0; abs_v[6][2][3] = 0;
233:     abs_v[6][3][1] = 0; abs_v[6][3][2] = 0; abs_v[6][3][3] = 0;
234:     abs_v[7][1][1] = 0; abs_v[7][1][2] = 0; abs_v[7][1][3] = 0;
235:     abs_v[7][2][1] = 0; abs_v[7][2][2] = 0; abs_v[7][2][3] = 0;
236:     abs_v[7][3][1] = 0; abs_v[7][3][2] = 0; abs_v[7][3][3] = 0;
237:     abs_v[8][1][1] = 0; abs_v[8][1][2] = 0; abs_v[8][1][3] = 0;
238:     abs_v[8][2][1] = 0; abs_v[8][2][2] = 0; abs_v[8][2][3] = 0;
239:     abs_v[8][3][1] = 0; abs_v[8][3][2] = 0; abs_v[8][3][3] = 0;
240:     abs_v[9][1][1] = 0; abs_v[9][1][2] = 0; abs_v[9][1][3] = 0;
241:     abs_v[9][2][1] = 0; abs_v[9][2][2] = 0; abs_v[9][2][3] = 0;
242:     abs_v[9][3][1] = 0; abs_v[9][3][2] = 0; abs_v[9][3][3] = 0;
243:     abs_v[10][1][1] = 0; abs_v[10][1][2] = 0; abs_v[10][1][3] = 0;
244:     abs_v[10][2][1] = 0; abs_v[10][2][2] = 0; abs_v[10][2][3] = 0;
245:     abs_v[10][3][1] = 0; abs_v[10][3][2] = 0; abs_v[10][3][3] = 0;
246:     abs_v[11][1][1] = 0; abs_v[11][1][2] = 0; abs_v[11][1][3] = 0;
247:     abs_v[11][2][1] = 0; abs_v[11][2][2] = 0; abs_v[11][2][3] = 0;
248:     abs_v[11][3][1] = 0; abs_v[11][3][2] = 0; abs_v[11][3][3] = 0;
249:     abs_v[12][1][1] = 0; abs_v[12][1][2] = 0; abs_v[12][1][3] = 0;
250:     abs_v[12][2][1] = 0; abs_v[12][2][2] = 0; abs_v[12][2][3] = 0;
251:     abs_v[12][3][1] = 0; abs_v[12][3][2] = 0; abs_v[12][3][3] = 0;
252:     abs_v[13][1][1] = 0; abs_v[13][1][2] = 0; abs_v[13][1][3] = 0;
253:     abs_v[13][2][1] = 0; abs_v[13][2][2] = 0; abs_v[13][2][3] = 0;
254:     abs_v[13][3][1] = 0; abs_v[13][3][2] = 0; abs_v[13][3][3] = 0;
255:     abs_v[14][1][1] = 0; abs_v[14][1][2] = 0; abs_v[14][1][3] = 0;
256:     abs_v[14][2][1] = 0; abs_v[14][2][2] = 0; abs_v[14][2][3] = 0;
257:     abs_v[14][3][1] = 0; abs_v[14][3][2] = 0; abs_v[14][3][3] = 0;
258:     abs_v[15][1][1] = 0; abs_v[15][1][2] = 0; abs_v[15][1][3] = 0;
259:     abs_v[15][2][1] = 0; abs_v[15][2][2] = 0; abs_v[15][2][3] = 0;
260:     abs_v[15][3][1] = 0; abs_v[15][3][2] = 0; abs_v[15][3][3] = 0;
261:     abs_v[16][1][1] = 0; abs_v[16][1][2] = 0; abs_v[16][1][3] = 0;
262:     abs_v[16][2][1] = 0; abs_v[16][2][2] = 0; abs_v[16][2][3] = 0;
263:     abs_v[16][3][1] = 0; abs_v[16][3][2] = 0; abs_v[16][3][3] = 0;
264:     abs_v[17][1][1] = 0; abs_v[17][1][2] = 0; abs_v[17][1][3] = 0;
265:     abs_v[17][2][1] = 0; abs_v[17][2][2] = 0; abs_v[17][2][3] = 0;
266:     abs_v[17][3][1] = 0; abs_v[17][3][2] = 0; abs_v[17][3][3] = 0;
267:     abs_v[18][1][1] = 0; abs_v[18][1][2] = 0; abs_v[18][1][3] = 0;
268:     abs_v[18][2][1] = 0; abs_v[18][2][2] = 0; abs_v[18][2][3] = 0;
269:     abs_v[18][3][1] = 0; abs_v[18][3][2] = 0; abs_v[18][3][3] = 0;
270:     abs_v[19][1][1] = 0; abs_v[19][1][2] = 0; abs_v[19][1][3] = 0;
271:     abs_v[19][2][1] = 0; abs_v[19][2][2] = 0; abs_v[19][2][3] = 0;
272:     abs_v[19][3][1] = 0; abs_v[19][3][2] = 0; abs_v[19][3][3] = 0;
273:     abs_v[20][1][1] = 0; abs_v[20][1][2] = 0; abs_v[20][1][3] = 0;
274:     abs_v[20][2][1] = 0; abs_v[20][2][2] = 0; abs_v[20][2][3] = 0;
275:     abs_v[20][3][1] = 0; abs_v[20][3][2] = 0; abs_v[20][3][3] = 0;
276:     abs_v[21][1][1] = 0; abs_v[21][1][2] = 0; abs_v[21][1][3] = 0;
277:     abs_v[21][2][1] = 0; abs_v[21][2][2] = 0; abs_v[21][2][3] = 0;
278:     abs_v[21][3][1] = 0; abs_v[21][3][2] = 0; abs_v[21][3][3] = 0;
279:     abs_v[22][1][1] = 0; abs_v[22][1][2] = 0; abs_v[22][1][3] = 0;
280:     abs_v[22][2][1] = 0; abs_v[22][2][2] = 0; abs_v[22][2][3] = 0;
281:     abs_v[22][3][1] = 0; abs_v[22][3][2] = 0; abs_v[22][3][3] = 0;
282:     abs_v[23][1][1] = 0; abs_v[23][1][2] = 0; abs_v[23][1][3] = 0;
283:     abs_v[23][2][1] = 0; abs_v[23][2][2] = 0; abs_v[23][2][3] = 0;
284:     abs_v[23][3][1] = 0; abs_v[23][3][2] = 0; abs_v[23][3][3] = 0;
285:     abs_v[24][1][1] = 0; abs_v[24][1][2] = 0; abs_v[24][1][3] = 0;
286:     abs_v[24][2][1] = 0; abs_v[24][2][2] = 0; abs_v[24][2][3] = 0;
287:     abs_v[24][3][1] = 0; abs_v[24][3][2] = 0; abs_v[24][3][3] = 0;
288:     abs_v[25][1][1] = 0; abs_v[25][1][2] = 0; abs_v[25][1][3] = 0;
289:     abs_v[25][2][1] = 0; abs_v[25][2][2] = 0; abs_v[25][2][3] = 0;
290:     abs_v[25][3][1] = 0; abs_v[25][3][2] = 0; abs_v[25][3][3] = 0;
291:     abs_v[26][1][1] = 0; abs_v[26][1][2] = 0; abs_v[26][1][3] = 0;
292:     abs_v[26][2][1] = 0; abs_v[26][2][2] = 0; abs_v[26][2][3] = 0;
293:     abs_v[26][3][1] = 0; abs_v[26][3][2] = 0; abs_v[26][3][3] = 0;
294:     abs_v[27][1][1] = 0; abs_v[27][1][2] = 0; abs_v[27][1][3] = 0;
295:     abs_v[27][2][1] = 0; abs_v[27][2][2] = 0; abs_v[27][2][3] = 0;
296:     abs_v[27][3][1] = 0;
```

[illegible]

```

100  p1 = Point(100,100)
101  p2 = Point(140,100)
102  p3 = Point(20,130), p4 = Point(130,130)
103  p5 = Point(20,130)
104  p6 =
105
106  # draw a box
107  p1 = Point(0,0)
108  p2 = Point(100,100)
109  p3 = Point(100,100)
110  p4 = Point(100,100)
111  p5 = Point(0,0)
112  draw_line(p1,p2)
113

```

```

235  sub routine
236  "This sub routine converts an 8 in hex to decimal"
237  use hex2dec
238  for x=1 to val(hex4,5):result=(16*hex)+
239  result*(hex2dec(hex4,5)+16*hex2dec(hex4,6)+16*hex2dec
240  hex4,7)
241  next x
242  return result
243  end sub
244  "Draw"
245  "This sub routine draws pic and its axes"
246  for x=1 to 2
247  plot P1(x),P1(5),2*plot P1(x),P1(1),plot P1(x),P1(4)
248  plot P1(1),P1(5),plot P1(2),P1(5),1
249  next x

```

[illegible]

```

150  P1A:000, 51, 03F120, P1B:010, 51, 03F101, 21
151  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
152  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
153  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
154  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
155  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
156  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
157  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
158  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21
159  P1A:000, 51, 03F101, 21, P1B:000, 51, 03F101, 21

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```

184. if f1q3,qto +1
185. 0PI241,P131,P1251
186. for i=P171 to P181 by P121
187. if prnd(frc1(P191),.5)+0,cxiz 5.2,2,1,P1241,qto +3
188. if prnd(frc1(P1261),.5)+0,cxiz 1.9,2,1,P1241,qto +2
189. cxiz 5.2,1,P1241
190. ltr 1,P1251,cpltt 3,0,1bl "1"
191. next i
192. if P1251-P141,qto +2
193. P141,P151,180,P1241,qto +2
194. ret
195. 0PI241,P131,P1251,P1301,P1261
196. P1271,0,if P1271(-0),01,0
197. for i=0 to P1261 by r0
198. if i=0,01,0,qto +1
199. ltr 1,P1251,cpltt 3,0,1bl "1"
200. next i
201. if f1q0,qto +2
202. f1q 0,0,0,P1291,P1261,qto +1
203. if P1251-P141,cfg 0,qto +2
204. P141,P1251,180,P1241,P1301,P1261,cfg 0,qto +3
205. ret
211.
212. "f1q0":
213. fnd 0,deg
214. if f1q2,qto +3
215. 270,P1241,P121,P1261
216. if And,P1251,P1251,90,P1241
217. for i=P131 to P141 by P119
218. if prnd(frc1(P151),.5)+0,cxiz 2.5,2,1,P1241,qto +3
219. if prnd(frc1(P1181),.5)+0,cxiz 1.2,2,1,P1241,qto +2
220. cxiz 5.2,1,P1241
221. ltr 1,P1251,cpltt 3,0,1bl "1"
222. next i
223. if A,qto +3
224. if P1251-P181,qto +2
225. P181,P1251,90,P1241,qto +3
226. ret
227. 270,P1241,P171,P1251,P1261,P1261
228. if And,P181,P1251,90,P1241,P1261,P1261
229. P1271,0,if P1271(-0),01,0
230. for i=0 to P1261 by r0
231. if i=0,01,0,qto +1
232. ltr 1,P1251,cpltt 3,0,1bl "1"
233. next i
234. if f1q0,qto +2
235. f1q 0,0,0,P1271,P1261,qto +1
236. if A,qto +3
237. if P1251-P181,cfg 0,qto +2
238. P181,P1251,90,P1241,P1261,P1261,cfg 0,qto +3
239. ret
240. "f1q1":
241. fnd log of number in 1"
242. if P1271,0 and P1291,0,qto +3
243. if abs(x1(-0),01,0
244. if f1q0, 4, log10(x1),01,qto +3
245. if f1q0, 4, log10(x1),01,qto +3
246. log10(x1)
247. ret
248.
249. "next":
250. neep,dsp "INSERT next DISC",xtp
251. open "DATA",4,append 4,1
252. on end 4,"next"
253. cll "REDATA",qto "prior"
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001 000003      (P11) 000003
002 "This program reads raw and calculated data previously received":
003 "on disc and plots specified data versus run number":
004 "with manually entered parameters. Variables":
005 "for expressions accepted. Expressions can be plotted on same graph":
006 "if axis scale can be log or lin. Plots can be (line or point)":
007 "Values that exceed limits are not plotted":
008 "Any value or expression can be used to inhibit plotting of data point":
009 "Positive or negative values can be plotted on log scale":
010 "Values less than .01 are set .01 for log scale":
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20: *MSAPF (3-12-HU);
21:
22: *This program computes Wind Speed Amplification Factor (MSAPF)
23: *with specified Escarpment Ratio (KEIR) and plots wind vs. NEH:
24: *Scale can be (log or lin). Plots can be (line or point):
25: *Values that exceed limits are not plotted:
26: *Positive or Negative values can be plotted on log scale:
27: *Values less than .01 are set to .01 for log scale:
28: *for H# 2255A PLOTTER:
29:
30: dim P(13)
31: dim Fst(7),Dst(26),Yst(18),Hst(16),Gst(2,3),Wst(26),Bst(1),Cst(26),Lst(5)
32: csg 1,2,3,4,5,6
33: *NONE *A *B *C *D *E *F *G
34: ent "EXPERIMENT UNIT",L4;cop(L4);cs
35: ent "ENTER Y AXIS LIMITS (MINIMUM)...",P(1);P(12);P(7)
36: ent "ENTER Y AXIS LIMIT (MAXIMUM)...",P(4);P(4);P(4)
37: ent "Y AXIS (log or lin) ?...";F;cop(F);cs
38: if F="LOG";csg 2;gto 14
39: ent "TIC MARK (Y axis) (MAXIMUM)...";P(5)
40: ent "TIC MARK (INTERMEDIATE)...";P(18)
41: ent "TIC MARK (MINIMUM)...";P(19)
42: ent "VARIABLE NAME (K1,M5B,etc)...";K5
43: ent "UNITS (Y axis)...";H5
44: ent "ENTER X AXIS LIMIT (MINIMUM)...";P(1);P(17);P(12)
45: ent "ENTER X AXIS LIMIT (MAXIMUM)...";P(4);P(4);P(4)
46: ent "X AXIS (log or lin) ?...";F;cop(F);cs
47: if F="LOG";csg 3;gto 14
48: ent "TIC MARK (X axis) (MAXIMUM)...";P(1)
49: ent "TIC MARK (INTERMEDIATE)...";P(26)
50: ent "TIC MARK (MINIMUM)...";P(21)
51: ent "VARIABLE NAME (K1,M5B,etc)...";K5
52: ent "UNITS (X axis)...";X5
53: ent "TYPE OF PLOT (line or point)...";F;cop(F);cs
54: if F="L";csg 4;gto 12
55: ent "ENTER CHARACTER FOR POINT";C5
56: ent "GRAPH AREA (1-000, 2-000)...";P5
57: if P5=1;gto 13
58: if P5=2;csg 5;gto 12
59: gto 13
60: *N *J *K
61: ent "REFL=...";R
62: ent "ENTER OR CHANGE EXPRESSION...";F;cop(F);cs
63: if F="L";csg 1;gto 12
64: gto "TIT"
65: dsp "ENTER EXP1 & 2 BELOW Dash cent 50";stp
66: "EXP1 IS X AXIS, EXP2 IS Y AXIS"
67:
68:
69:
70: "EXP1"ret "MSAPF"
71:
72: "EXP2"ret N
73:
74:
75:
76:
77: gto "TIT"
78: "NZU"resave "MSAPF";dsp "MSAPF reserved";stp
79: --- --- --- End of Main Program --- ---
80:
81:
82:
83:
84: "TIT":
85: if Flog;P(13);c11 "log";P(13);P(14);c11 "log";P(14)
86: if Flog;P(17);c11 "log";P(17);P(18);c11 "log";P(18)
87:
88: if P(13) and P(14);gto 13
89: (P(14)-P(13))/100;P(13)=P(13)+P(14);P(14)=P(14)+P(13)
90: gto 12
91: (abs(P(13))-abs(P(14)))/100;P(13)=P(13)+P(14);P(14)=P(14)+P(13)
92: if P(17) and P(18);gto 14
93: (P(18)-P(17))/100;P(17)=P(17)+P(18);P(18)=P(18)+P(17)
94: if Flog;P(17);c11 "log";P(17);P(18);c11 "log";P(18)
95: gto 13
96: (abs(P(17))-abs(P(18)))/100;P(17)=P(17)+P(18);P(18)=P(18)+P(17)
97: if Flog;P(17);c11 "log";P(17);P(18);c11 "log";P(18)
98: c11 P(13);P(14);P(17);P(18)
99:
100: ent "SET PLOTTER LIMITS TO MAX FOR DRAWING";stp
101: ltr P(13);P(12);csg 1,2,5
102: fad 5;cpit 46,-1
103: ib1 "1. BLANK NML CODE 4326 FUNET/OSP SNI",C5
104: ltr P(13);P(12);cpit 7,-2
105: ib1 "Y AXIS=","A5," (UNIT5=","H5
106: ltr 1;ib1 "X AXIS=","K1," (UNIT5=","P(21)," MAX=","P(26),"
107: ib1 "X AXIS=","K1," (UNIT5=","Y5
108: ib1 "LIMIT MIN=","P(21)," MAX=","P(33),"
109: dsp "RESET PLOTTER FOR GRAPH";stp
110: dsp "DRAWING AXIS"
111: for Kst to 2
112: plt P(8),P(4), 2;plt P(8),P(13);plt P(7),P(13)
113: plt P(7),P(4);plt P(8),P(4),-1
114: next K
115: c11 "tick"
116: c11 "tick"
117: dsp "CHANGE PEN 1, THEN CONTINUE";stp
118:
119: (A5)(C5)(D5)(N5);X
120: "plot":
121: fad 6;dsp "PLOTTING"
122: csg 5,1,1,0
123: "EXP1"resave Flog;P(15);c11 "log";P(15)
124: if P(15)(P(17);A1);gto 12
125: if P(15)(P(17);R+1;gto 16
126: "EXP2"resave Flog;P(15);c11 "log";P(15)
127: if P(15)(P(14);A1);gto 14
128: if P(15)(P(14);D+1;gto 13
129: if Flog;ltr P(15);P(16);cpit 1,3,-1;ib1 F4;gto 12
130: plt P(15);P(16)
131:
132: if N=P(26);gto "next"
133: c11 "NEH"
134: gto "plot"
135:
136: "NEH":
137: N=0;N
138: ret
139:
140: "END":
141: plt "X AXIS"

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20: "SPCRNC":
21:
22: "This program takes raw data from disc in drive (1) and stores":
23: "raw and re computed values on initialized disc in drive (1)":
24: "Changes to FCAL values may be added in sub(FCAL)":
25:
26:
27: "A contains the averages of the data the Monitor Logs":
28: "D contains the final printout values":
29: "E contains entered month(11), day(12), julian day(13), 14":
30: "temporary storage for U11(12), 16 and U12(12), 16":
31: "averaging period(9); Divesor(10); Parity error(11)":
32: "temp range(12), 1131=sampling rate for Knollenburg":
33: "C contains the num. of days in each month; temp day(13)":
34: "G contains the names of each month":
35: "Q contains the line number for chaining subprograms":
36: "U contains the converted analog data":
37: "K contains the averaged digital data":
38: "Initializing data follows":
39: dim A(1:9,3),E(1:3),G(1:3),G(1:3,3)
40: dim U(1:12),T(1:40),D(1:30),K(1:2),P(1:3),R(1:3),S(50)
41: dim F(1:7),D(1:26),Y(1:4),M(1:36),R(1:36),U(1:2,36)
42: D500
43: "D5": "F5
44:
45:
46: drive 6;files DATE,TIDET,METDNT,MSEC,PINC;hread 1,D1,G1;hread 2,F5
47: hread 4,M9;hread 5,R9,U9
48: asgn "METDAT",0,1,1
49: on end 3,"END"
50: on end 9,"next"
51: "MAIN":hread 3,D(1),E(1),K(1),U(1)
52: hread 3,F(1),F5
53: hread 3,B(1),F5
54: for i=1 to 100:P(1)=i;next i
55: cll "ROUND OFF"
56:
57: fxd 6;prt D(26)
58: D(1)A(6,3);D(13)A(13,3);D(14)A(14,3);D(17)A(17,3)
59: for M=2 to 19;U(1)A(M,2);next M
60: chain "CRNCHG",0,41
61: qto "FCAL"
62: asp "CRNCHG";c11 "CRNCHG";c11 "MET26"
63: qto "MAIN"
64: "END":asp "INERT NEXT DATA DISK";stp
65: asgn "METDAT",3,0
66: on end 3,"END"
67: qto "MAIN"
68:
69: "FCAL":
70: "Enter changes to FCAL values below":
71:
72:
73:
74: ret
75:
76: "----- End of Main Program -----":
77: "----- COMPUTE AND PRINT THE MET DATA -----":
78: "MET26":chain "CRNCHG",0,59
79: dsp "CRNCH2";c11 "CRNCH2"
80: for i=1 to 100:P(1)=i;next i
81: chain "LKRHR3",0,62
82: dsp "CRNCH3";c11 "CRNCH3"
83: for i=1 to 100:P(1)=i;next i
84: chain "SCRNCH",0,64
85: dsp "SCRNCH";c11 "SCRNCH"
86: "sprt":sprt 9,D(1),E(1),K(1),U(1),P(1),F5,B(1),F5,K(1)
87: ret
88:
89: "ROUND Off":fxd 0;str(D(26))D1;val(D5(16,11))r6
90: "30")D5(10,11)
91: if r6<36;"00")D5(16,11)
92: val(D5(2,3))#1e8+val(D5(4,5))#1e6+val(D5(6,7))#1e4+val(D5(8,9))#1e2)r6
93: r0+val(D5(10,11))/D(20);ret
94:
95: "next":dsp "INSERT NEXT DESTINATION DISK";stp
96: asgn "METDAT",9,1
97: on end 9,"next"
98: qto "sprt"
99:
100: "FNZU":reave "SPCRNC";asp "SPCRNC RESERVED";end
101:
102:
103:
104:
105:
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```